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CONFERENCE ON THE ECONOMICS OF AIRPORTS AND AIR NAVIGATION SERVICES

(Montreal, 19 - 28 June 2000)

Agenda Item 1: Economic situation of airports, air navigation service providers and their financial relationships with air carriers and other users

THE WORLD OF CIVIL AVIATION

(Presented by the Secretariat)

INFORMATION PAPER

SUMMARY

This information paper highlights major developments during the year 1999 and for the forecast period 2000-2002 reflecting findings of the forthcoming Circular 279, *The World of Civil Aviation — 1999-2002.* The Appendix to this information paper contains a draft version of Circular 279 which will be the eighth in an annual series of publications covering recent and future developments in civil aviation. In the draft circular, Part I reviews the main events in or affecting international civil aviation in 1999; Part II analyses trends in the world economy and the air transport industry and presents global forecasts of airline scheduled passenger traffic through to 2002; and Part III reviews, on a region-by-region basis, the year 1999 and gives prospects through to 2002. This information paper has been provided to supplement the working paper ANSConf-WP/13 and as background material. Developments concerning providers of air transport infrastructure, both airports and air navigation services, discussed in Chapter 3 might be of particular interest to Conference participants.

1. Major developments during the year 1999

1.1 Growth in the world economy started to recover as did airline traffic but airline operating profits softened and aircraft orders declined.

1.1.1 The world's Gross Domestic Product (GDP) grew by an estimated 3.0 per cent in real terms. On a regional basis the change in GDP ranged from an estimated increase of some 4.2 per cent for North America to about 0.2 per cent for Latin America and the Caribbean (Chapter 1).

1.1.2 Total scheduled passenger/freight/mail tonne-kilometres performed and international tonne-kilometres were both up by about 6 per cent. There were significant differences in the traffic growth between regions, ranging from increases in total traffic of over 8.8 per cent for carriers based in Africa to a decline of almost 0.3 per cent for those in Latin America and the Caribbean in terms of passenger-kilometres performed (Chapter 2 and Chapter 6).

1.1.3 Preliminary estimates indicate that the world's scheduled airlines as a whole experienced an operating profit — 4.1 per cent of operating revenues compared with 5.4 per cent in 1998 — for the seventh year in succession (Chapter 2).

1.1.4 The number of turbo-jet aircraft ordered was 987 in 1999 compared to 1463 in 1998. The financial commitment for orders placed for these aircraft with the major aircraft manufacturers is estimated to be about U.S.$51 billion (Chapter 2).

1.2 **Liberalization was fostered through bilateral agreements and regional developments in the regulatory field, while privatization of airlines continued and airline alliances expanded in the industry.**

1.2.1 A significant number of bilateral agreements and memoranda of understanding concluded between States contained liberalization measures. Regional organizations in Africa, the Caribbean, the Middle East and South-East Asia reaffirmed or agreed to expand gradual liberalization of intra-regional air services (Chapter 2).

1.2.2 Privatization aims were achieved during the year for seven airlines, privatization objectives were made known for another two airlines and preparations for privatization continued for some 26 carriers. Airlines continued to expand transnational alliances, with most agreements including code sharing as a collaborative element (Chapter 2).

1.3 **More autonomy was given to providers of air transport infrastructure, both airports and air navigation services, and capacity expansion through airport construction continued.**

1.3.1 The year witnessed accelerated activity at the government level towards establishing autonomous entities to operate airports or provide air navigation services, with growing emphasis being placed on active private participation in airport operations, management and finances (Chapter 3).

1.3.2 Europe, Asia, and North America (including Mexico) led the way in new airport projects completed, under construction or projected. Major airport expansion projects were under way in all regions (Chapter 3).

1.4 **Implementation of a satellite-based navigation system continued to yield early benefits while existing air navigation facilities and services continued to be enhanced.**

1.4.1 Implementation of communications, navigation and surveillance/air traffic management (CNS/ATM) functionalities into ATS systems, led, for example, to airspace over Siberia in the Russian Far East becoming increasingly available for international civil aviation (Chapter 3).

1.4.2 Air traffic control (ATC) systems around the world continued to be updated as part of the evolution process to a seamless global air traffic management system. Considerable progress was made in the computer preparation of global forecasts of significant weather by the two world area forecast centres and global coverage by three ICAO satellite broadcasts was achieved (Chapter 3).

1.5 **Safety remained a top priority as did aviation security.**

1.5.1 Preliminary information on aircraft accidents involving passenger fatalities in scheduled air services shows that there were 20 fatal aircraft accidents in 1999 involving 489 passenger fatalities compared to 20 fatal accidents and 904 passenger fatalities in 1998. The number of passenger fatalities per 100 million passenger-kilometres decreased to 0.02 from 0.035 in 1998. By year-end, 49 administrations in ICAO Contracting States had been assessed through the ICAO Universal Safety Oversight Audit Programme (Chapter 4).

1.5.2 As in 1998, six acts of unlawful interference were officially reported or confirmed by concerned States in 1999 (Chapter 4).

1.6 **ICAO's work on environmental protection intensified**.

1.6.1 The question of noise certification standards more stringent than those established in Annex 16, Volume I, Chapter 3 was taken up. Following adoption of a recommendation on reduced NOx emissions, ICAO's work on aircraft engine emissions focussed on more stringent emission standards for new engines, reducing fuel burn and the potential applicability of market-based options such as charges, taxes or emissions-trading to engine emissions (Chapter 4).

2. Medium-term forecasts for 2000 to 2002

2.1 **Since recovery from the brief slowdown is progressing, airline traffic is expected to grow stronger with regional differences to continue and airline finances to remain stable.**

2.1.1 Total scheduled passenger traffic (in terms of passenger-kilometres performed) is expected to grow well above the 5 per cent mark during the years 2000-2002 exceeding the average annual rate of about 4.6 per cent for the period 1988-1999 (Chapter 5).

2.1.2 Scheduled airline revenues (including revenues from freight, mail and other sources as well as from passengers) and airline expenses are forecast to increase at a somewhat slower rate below the average annual rate of about 5.6 per cent for both during the past ten years, leading to fairly stable operating results over the next three years (Chapter 5).

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

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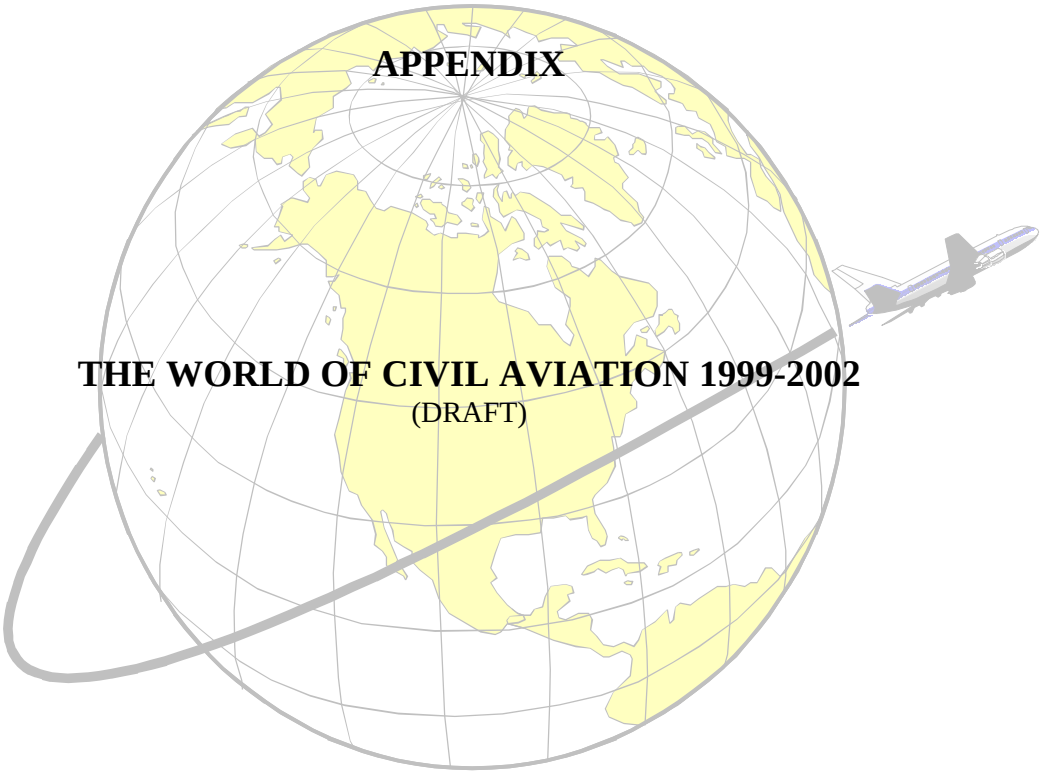
APPENDIX



THE WORLD OF CIVIL AVIATION 1999-2002

(DRAFT)

1. Sources

1.1 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).

1.2 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.

1.3 Extensive aviation statistics for 1998 may be found in the forthcoming ICAO statistical yearbooks, *Civil Aviation Statistics of the World — 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 long-term forecasts the next of which covering the period 2000-2010, will be published in the forthcoming *Outlook for Air Transport to the Year 2010*.

2. Technical Notes

2.1 The statistical data for 1999 appearing in the draft 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 in 1999);

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.

2.2 Unless indicated otherwise, all references in this circular to “cents” mean “U.S. cents” and all references to “$” mean “U.S. dollar”.

3. Disclaimer

This document has been issued without formal editing.

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PART I

THE WORLD IN 1999

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. Tourism, international trade in goods and other commercial activities have a direct impact on the demand for air travel and air freight.

1.2 The world economy regained strength in 1999 following the slowdown in 1998. A robust economic performance continued in North America and, to a lesser extent, in Western Europe. Economic recovery spread in the Asia/Pacific region, contrasted by a weakening performance in Latin America and the Caribbean. Overall economic growth remained stable for Africa but lost some momentum in the Middle East compared to the previous year (see also Table 5-1). Rising crude oil prices may impact the health of the world economy and will increase 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 1999, which follows in Chapters 2 to 4, this chapter reviews global developments in 1999 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 2002 (Chapter 5) and Part III, Regional Perspectives 1999 to the year 2002 (Chapter 6), respectively.

GROSS DOMESTIC PRODUCT

1.4 In terms of Gross Domestic Product (GDP) development, which is the broadest available measure of economic activity, the world economy recaptured a stronger growth path and expanded by an estimated 3.0 per cent (in real terms) in 1999, compared to 1.9 per cent in 1998. This global result masks a wide spread in 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 1999.

1.5 The economies of industrial countries expanded almost in line with the global average at an estimated 2.9 per cent GDP growth rate in 1999. Since they produce more than half of global output, their growth had an overall stabilizing effect on the world economy. The continuous robust economic

growth in North America (4.2 per cent), backed by strong domestic demand, was a notable supporting factor.

1.6 Europe as a whole achieved an average GDP growth of 2.3 per cent in 1999, to which the European Union contributed at a similar rate. Economies of Central and Eastern European countries grew in the aggregate around 2.5 per cent. Following a period of economic declines, most countries of the Commonwealth of Independent States (CIS) experienced GDP growth averaging 2.9 per cent.

1.7 The 1999 economic performance of developing countries averaged about 3.8 per cent GDP growth, which reflects a stabilization towards the end of the decade albeit at a lower level than throughout most of the 1990s. Africa's economic growth softened slightly with a 2.7 per cent GDP increase. The region with the largest share in the world economy, Asia/Pacific, regained some of its economic strength with approximately 3.5 per cent GDP growth in 1999. The developing economies in Asia/Pacific, accounting for almost two–thirds of the region's output, made a significant contribution as their aggregate GDP grew by 6.0 per cent, but this result masks vast differences between countries. China's GDP growth led again at over 7.1 per cent. Several South-East Asian economies gradually recovered from recession in 1998, and so did Japan which saw its GDP slowly recovering around 0.3 per cent growth in 1999. Asia's four newly industrialized economies (NIEs) regained momentum, averaging 7.7 per cent GDP growth. Australia's economic growth flattened with a GDP increase around 4.4 per cent, while New Zealand's 5.6 per cent growth represented a recovery from recession.

1.8 In other regions, the trend of a softened economic development prevailed. Latin America and the Caribbean as a region was faced with stagnation (0.2 per cent GDP growth) and experienced the weakest economic performance in the past decade. The Middle East (2.5 per cent GDP growth) remained basically stable compared to the previous year.

TRADE DEVELOPMENTS

1.9 In 1999, worldwide growth of trade in goods and services stabilized — its volume grew at around 4.6 per cent close to the slow growth experienced in 1998. Trading of manufactured goods expanded at an almost 5 per cent rate, manifesting the slower growth path of international trade compared to rates in the 10 per cent range in recent years. Although internationally marketed services benefited from globalization of economic activities and gained importance, trading of goods still commanded an 80 per cent share of world exports value, amounting to 6 844 billion dollars in 1999 according to the International Monetary Fund (IMF). In broad terms, the seven major economies traded nearly half of the value of both exported and imported goods worldwide, all industrialized economies together accounted for almost three-quarters, while trade of developing countries and Asia's NIEs accounted for the rest.

1.10 Within the broad picture, industrial economies achieved mixed results in 1999. For most individual countries, export expansions were weaker than experienced during the sharp contraction of export growth in 1998, with a few exceptions of modest improvements (the United States, Canada and Japan among the major trading partners). The substantial progress made in regaining stability in

Asian economies, affected by the erosion of economic conditions during the1997/98 crisis, had a positive impact on world trade.

1.11 Impacted by negative trade balances, current account positions further deteriorated during 1999, leading to a 75 per cent higher deficit in the order of 160 billion dollars on a worldwide basis; imbalances among major trading blocks and nations widened. The United States' current account deficit continued to rise in 1999 to $337.5 billion, while the surpluses receded in Japan to $119.7 billion and more dramatically in the European Union to $49.4 billion. Among developing countries, positive current account balances were reported for China ($11 billion), Asia's NIEs grouped together with Indonesia, Malaysia, Thailand and the Philippines ($50 billion) and, as a new development, also for the regions of Africa and the Middle East (combined $14 billion). Losses were reported for the regional/sub-regional groups of the rest of Asia (-$9 billion) as well as Latin America (-$44 billion). A positive balance ($10 billion) was achieved by Central and Eastern European countries among the group of countries in transition, an IMF designation for the transition from centrally-planned towards market-based economies in Central and Eastern Europe and the CIS.

TOURISM

1.12 The demand for international air travel is fuelled by the expansion of international tourism. The World Tourism Organization (OMT-WTO) estimated a world total of 657 million international tourist arrivals and 455 billion dollars tourist receipts in 1999, representing an improved annual growth rate of 3.2 per cent for both arrivals and receipts, compared to 2.7 per cent and 0.3 per cent, respectively, in 1998. Figure 1-2 provides global results in tourist arrivals and receipts from 1990 to 1999.

1.13 Regional developments reflected the overall trend of recovery from a temporary slow down in otherwise rapidly expanding travel and tourism markets. Europe's mature intra-regional and inter-regional travel markets, holding an almost 60 per cent share in international arrivals, attracted 1 per cent more arrivals in 1999 (3.1 per cent in 1998) with very good results in Southern Europe and losses in Central and Eastern Europe due to political instabilities in the Balkan area. Within the Asia/Pacific region, international arrivals in South Asia grew by 3.7 per cent and counted 5.4 million tourists. Following two years of decline, travel to and within East Asia and the Pacific recovered with 7.5 per cent more arrivals, reaching a new record of nearly 94 million international tourist arrivals, a 14 per cent share of world arrivals. Travel to and within North America grew by 2 per cent and reached 66.5 million arrivals, 70 per cent of which were in the United States. Tourist arrivals in Latin America and the Caribbean increased markedly, by 8 per cent, and reached the 60 million mark. The relatively small markets of Africa and the Middle East showed a stronger performance with international arrivals growing at 17.5 per cent and 9 per cent, respectively.

INFLATION, INTEREST RATES AND CURRENCY MARKETS

1.14 Since the early 1980s, consumer prices in industrial countries have increased at steadily declining levels despite sharp fluctuations in commodity prices, including oil. During 1999, inflation in most industrial countries continued to either fall or stabilize at low levels, resulting in an aggregate rate of 1.4 per cent. In the context of an extended economic boom, the United States recorded an inflation rate of 2.2 per cent in 1999 compared to 1.6 per cent in 1998. In contrast, in a climate of low domestic demand, Japan's consumers experienced a drop of 0.4 per cent in consumer prices.

1.15 Consumer prices in developing countries as a group followed a similar overall trend of declining inflation rates and achieved in 1999 a historically low average rate of 6.7 per cent. Large variations prevailed from region to region and among countries within regional groupings. Developing countries in Asia managed to reduce inflation to low levels as reflected in the regional aggregate rate of 3.1 per cent compared to 8 per cent the previous year. In Africa, inflation got under better control in recent years and the regional rate kept fairly stable, settling at 9 per cent in 1999. For South America and the Caribbean, stabilization of inflation around a 10 per cent mark for the third consecutive year meant a long-awaited success after triple-digit inflation rates into the mid-nineties. Inflation in the Middle East region reached a slightly lower rate compared with the previous year (18.3 per cent). For countries in transition, the aggregate inflation rate rose again to almost 40 per cent driven largely by Russia's 88.4 per cent consumer price increase, while Central and Eastern European countries (excluding CIS) saw it rise by 8.8 per cent.

1.16 The nominal long-term interest rates in industrial countries continued the downward trend predominant in the nineties with some modest fluctuations. The average rate rose from 4.5 per cent in 1998 to 5.3 per cent in 1999, back to the 1997 level. Exceptionally low interest rates prevailed in Japan with long-term rates at 1.9 per cent in 1999. In this environment of relative price stability and low cost of financing in the industrial countries, inflationary pressures on airlines and other civil aviation business were generally subdued.

1.17 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 recovered against the United States (U.S.) dollar in 1999, particularly during the last quarter. Depreciation of a number of Asian currencies in recent years contributed to a general strengthening of the U.S. dollar. At the same time, the common unit of the European exchange rate mechanism, ECU, started to depreciate, closely followed by the German Mark and currencies of other countries participating in the mechanism. The U.K. pound basically sustained the high rate against the U.S. currency gained in 1997 (Figure 1-3).

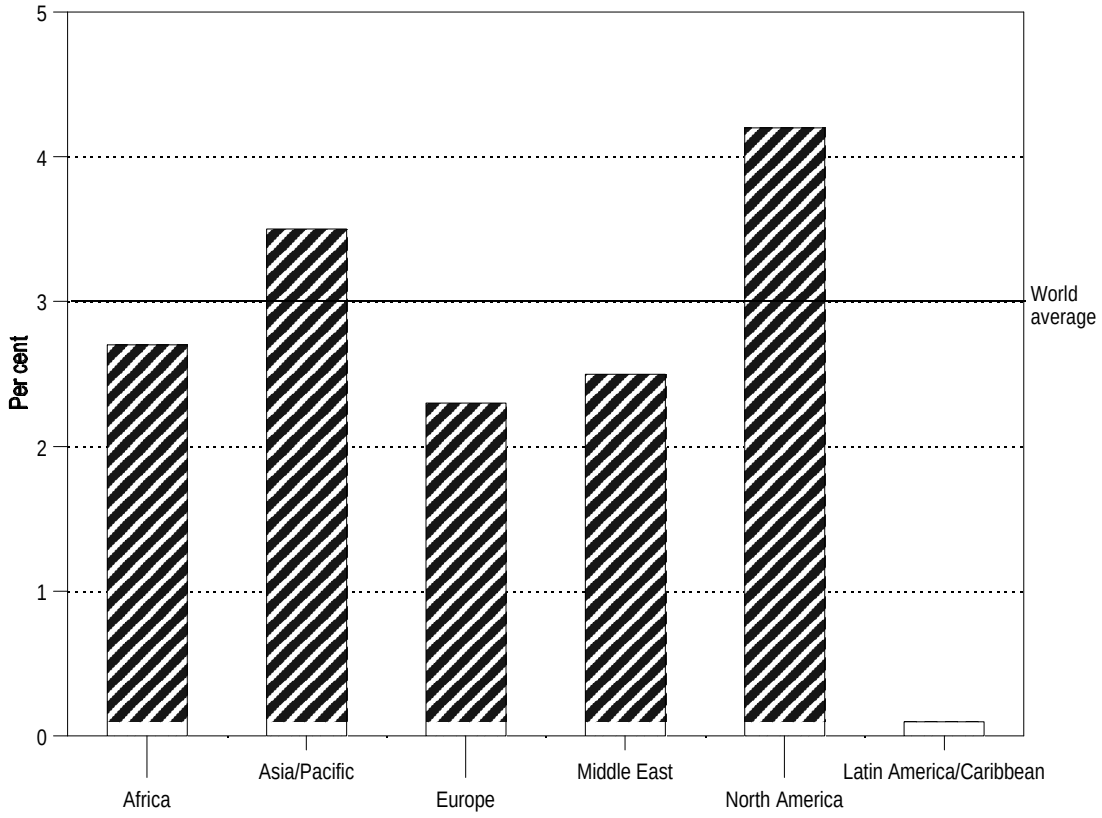
1.18 Movements in exchange rates affect relative prices of international travel markets and hence the related demand and subsequent geographical distribution of traffic flows. For example, several developing countries in South-East Asia experienced a drastic devaluation of their national currencies against 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 typically react to such price advantages, leading to an increase in demand for in-bound air travel.

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

CRUDE OIL AND JET FUEL

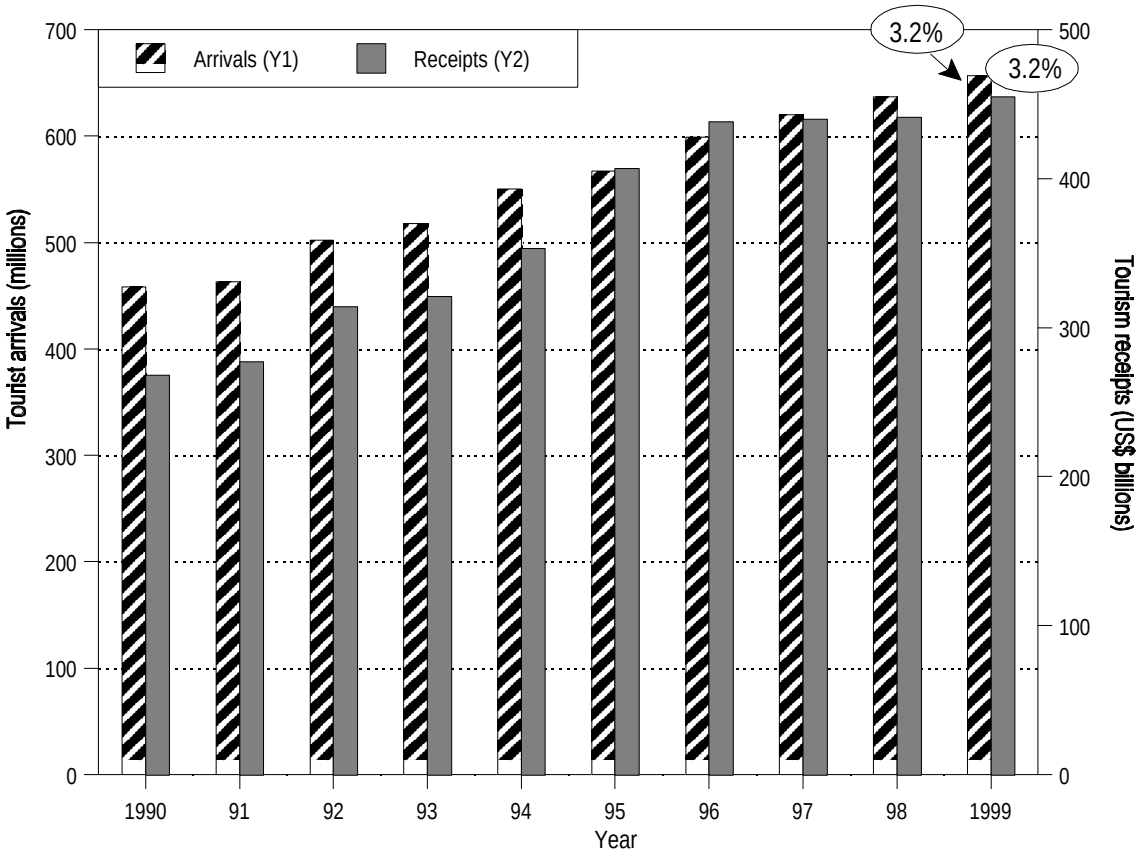
1.20 The year 1999 marked the end of a two-year downward trend for world prices of crude oil when this commodity was supplied by oil-exporting countries competing for market shares much in excess of its demand. Compliance by members of the Oil and Petroleum Exporting Countries with crude oil production cuts led to a steady and rapid price rise. The world trade price of crude oil in U.S. dollars more than doubled during 1999 from a range of about 10 dollars a barrel at the beginning of the year to almost 25 dollars a barrel towards the end, reaching a nine-year high. Consequently, jet fuel prices increased, resulting in higher operating costs for airlines worldwide. The average annual price of jet fuel in U.S. dollars rose from 41 cents per gallon in 1998 to 49 cents per gallon in 1999, starting from 30 cents and reaching 70 cents by year's end. (Figure 1-4). Fuel costs have ranged between 12 and 25 per cent of scheduled airline's operating costs over the past decade.

Chapter 1 Graphs



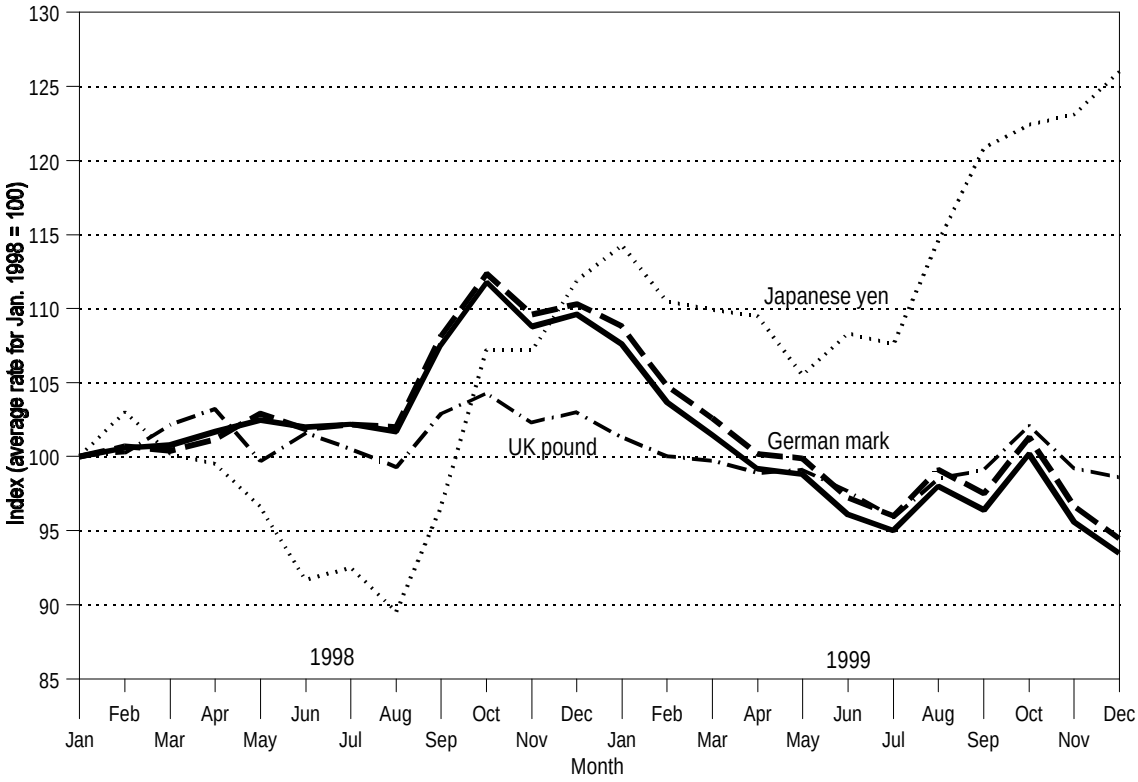
Source: ICAO estimates based on data from the World Bank, the International Monetary Fund (IMF), WEFA Group, Organisation for Economic Co-operation and Development (OECD) and other economic sources.

Figure 1-1. Annual change in real GDP by regions, 1999/1998



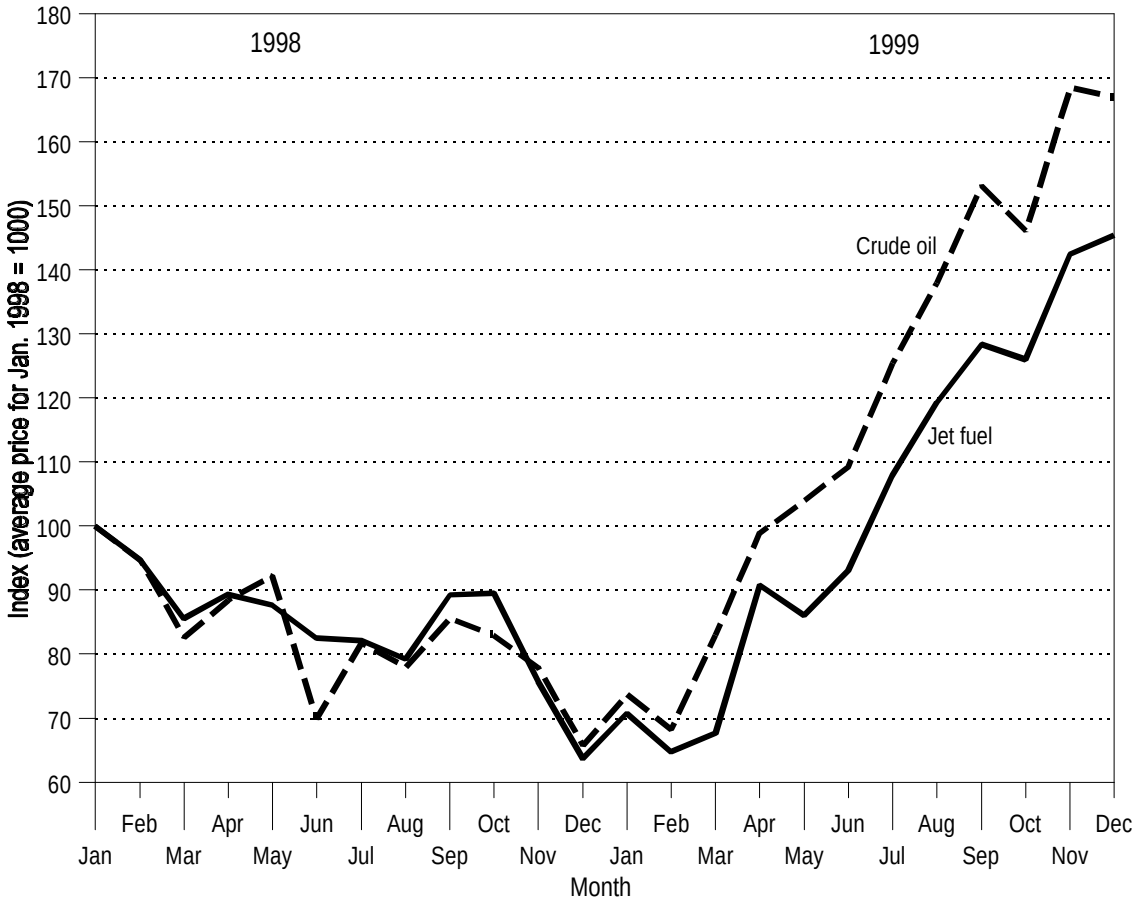
Source: OMT-WTO.

Figure 1-2. Annual change in global tourist arrivals and receipts by region of destination (1999/1998)



Source: IATA five-day rate.

Figure 1-3. Currency variations with respect to the U.S. dollar (January 1998 to December 1999)



Source: Petroleum Economist and the Journal of Commerce.

Figure 1-4. Trends in crude oil and jet fuel prices (January 1998 to December 1999)

Chapter 2
Air Carriers and their Fleets

2.1 This chapter reviews developments in 1999 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 1999 is also included.

ECONOMIC REGULATION

Air transport agreements and negotiations

2.2 Bilateral arrangements concluded in 1999 reflected a continuing trend of liberalization. Based on publicly available sources, States concluded 67 bilateral agreements, memoranda of understanding (MOUs) and amendments, a decrease of 9 from the previous year. In regional terms, three quarters of the agreements, amendments and MOUs were between States from differing regions (51) as opposed to those between States in the same region (16). As in 1998, this proportion indicates an increasing reliance on regional air service agreements and arrangements by States for intra-regional air services.

2.3 Some information was available on the content of 38 agreements, 19 amendments and 2 MOUs concluded in 1999. Of these, 9 agreements could be classified as traditional (single designation, predetermination of capacity, double approval tariff regimes); and 5 amendments and 1 MOU provided for specific capacity increases (e.g. 3 weekly flights on a named route). The remaining 44 agreements, amendments and MOUs contained one or more liberalization measures, such as multiple designation, unrestricted capacity and all cargo service, and expansion of code sharing. The number of "open skies" agreements concluded in 1999 increased: out of 16 such agreements, 11 provided for unrestricted traffic rights, capacity and tariff flexibility; 3 were on a phase-in basis and 2 others expanded their coverage to include provisions on intermodal transportation, allowing airlines to sell services on both air transport between the two countries and on connecting surface transport, such as rail or bus services, to other destinations in the parties' territories or in third countries.

2.4 In terms of specific provisions, 11 agreements or amendments provided for multiple designation of airlines, 3 limited such designations to 2 per party and 2 limited designations to 1 airline per party. Twelve agreements and amendments provided for free-determination of capacity, 5 agreements included some form of progressive liberalization, such as multi-year capacity increases, and 8 provided for predetermination of capacity. With respect to tariff regimes, 18 agreements and amendments provided for tariff flexibility including country of origin tariffs, double disapproval or no requirement for the filing of tariffs, while 4 others required the approval of tariffs by both parties. Of the 10 agreements containing air carrier ownership and control provisions, the use of the traditional

national ownership and control criteria remained predominant in 6 agreements, while “incorporation and principle place of business” were applied as an alternative in 3 agreements, and a “community of interest” provision was included in one agreement. Traffic rights remained a sensitive issue. Twenty-seven agreements and amendments provided for unrestricted third and fourth freedom rights, 11 agreements had unrestricted fifth freedom routes while 10 others did not allow for fifth freedom traffic or were subject to a subsequent agreement. Unrestricted cargo operations were also provided in five agreements which reflected a rise in the liberalization of cargo activity.

2.5 In the area of commercial matters, 8 agreements and amendments had provisions on currency conversion and remittance, 9 on employment of non-national personnel, 7 on airline sales activities and 4 permitted airlines to perform their own ground handling. Fifteen agreements expanded coverage to allow code-sharing arrangements between designated airlines, including third country code sharing, and 3 also had provisions on leasing arrangements.

2.6 The United States concluded another 9 open skies agreements during the year with countries in different regions, 3 each in Latin America and the Middle East, and 1 each in Africa, Europe and Asia/Pacific. The United States also formally signed a new open skies agreement with Italy, which had been reached in the previous year but had been pending the subsequently granted antitrust immunity by the United States authorities for a new alliance between Alitalia, Northwest and KLM which would allow them to set prices jointly and sell seats on each other's flights. Negotiations for an open skies agreement between the United States and the United Kingdom reached another deadlock associated with the rejection by the United States authorities of an application by British Airways and American Airlines for antitrust immunity for their alliance. Further attempts were made at the end of 1999 to revive the negotiations, focusing on air cargo liberalization, but without success. Elsewhere, the Government of Australia announced a more liberal aviation policy, providing for negotiations of reciprocal open skies arrangements with like-minded States, including multiple airline designation, unrestricted market access, pricing, freight and code sharing.

2.7 Under a “Safe Skies for Africa Initiative”, the United States and 14 Sub-Saharan African States signed a Memorandum of Cooperation primarily aimed at improving air transport infrastructure, but also calling for promoting expanded and liberalized air services across the African continent. In October, the Association of European Airlines (AEA) released a Policy Statement on a Transatlantic Common Aviation Area (TCAA) intended to give impetus to negotiations between the European Union (EU) and the United States to develop a single regulatory framework. The TCAA proposal identifies core areas for liberalization, including the freedom to provide services, airline ownership and the right of establishment, competition policy and leasing of aircraft. It advocates liberalization between EU-U.S. markets on an incremental, regional basis, with provisions for other like-minded States to join subsequently. This initiative was subsequently promoted by the European Commission. In December, the Government of the United States sponsored a multilateral ministerial conference in Chicago on the theme “Aviation in the 21st Century — Beyond Open Skies” with an objective to “deepen understanding of critical aviation issues of the next century”. Discussions focused on the need for greater liberalization and adequate infrastructure, the primacy of safety and security as well as the nature and means of liberalization.

Trade in services developments

2.8 In 1999, there were a series of meetings on trade in services in preparation for the new round of negotiations to be launched by the World Trade Organization (WTO), including the review of the Annex on Air Transport Services in the General Agreement on Trade in Services (GATS). The United Nations Economic and Social Commission for Western Asia convened a meeting in Beirut to heighten the awareness of the GATS issues in the region, which underlined the widespread interest in the future of air transport regulation by different bodies not directly involved in air transport. The United Nations Conference on Trade and Development (UNCTAD) held a meeting in Geneva to focus attention on the GATS review and encouraged States to prepare their positions for the negotiations. The Organization for Economic Cooperation and Development (OECD) held a workshop to discuss the current situation and long-term outlook of the air cargo industry, the relevant legal, economic and technical regulations, and possible ways in which government policies could advance regulatory reforms. The WTO held its Third Ministerial Conference in Seattle, United States, from 30 November to 3 December. Although the meeting failed to set the agenda for a comprehensive new round of multilateral trade negotiations, the review of the Air Transport Annex in the GATS by the WTO will proceed in 2000 as part of a built-in agenda by an earlier ministerial decision.

Regional regulatory developments

2.9 Several regions witnessed progress of air transport liberalization in 1999. The Council of Arab Transport Ministers of the Arab Civil Aviation Commission (ACAC) reached an agreement to liberalize intra-Arab air services over a period of five years, gradually ending restrictions on third, fourth and fifth freedom traffic rights for carriers of ACAC Member States. The agreement provided for multiple designation of carriers with modified national ownership and control criteria, and encouraged code sharing as well as cooperation, particularly in ground handling. In Latin America, the Air Transport Working Group, set up by the Conference of Ministers of Transport, Communications and Public Works of South America, adopted a resolution to continue its work in developing a common regional commercial air policy with a view to liberalizing air transport services. A policy proposal will be presented to the Ministers of Transport in a meeting scheduled for November 2000.

2.10 In Africa, at a meeting of the Economic Commission for Africa (ECA) held in Yamoussoukro in November 1999, the African Transport Ministers signed a provisional aviation agreement for the gradual liberalization of scheduled and non-scheduled intra-Africa air transport services with the aim of reaching full integration by 2002. The agreement would permit exchange of all 5 traffic freedoms among the parties with certain conditions imposed in the first 2 years on fifth freedom operations (no restriction on carriage of fifth freedom traffic on routes where no third and fourth freedom carriers operate, while 20 per cent of the capacity may be used for fifth freedom traffic on routes where third and fourth freedom carriers operate). It would also allow each party to designate at least one airline, including an "eligible airline" from another party to operate on its behalf according to established criteria as well as an eligible African multinational airline in which it is a stakeholder. There would be no requirement for approval of tariffs, only a requirement to file tariff increases. The agreement would become effective 30 days after ratification which is scheduled to take place at the next meeting of the African Ministers of the Organization of African Unity (OAU) in Togo, in June 2000. On a sub-regional level, 21 States, forming the Common Market for Eastern and Southern Africa (COMESA),

reached an agreement to phase in liberalization of air transport within the sub-region. The first phase would allow free movement of intra-COMESA air cargo and non-scheduled passenger services, 2 daily scheduled passenger services between any city-pairs with no capacity restrictions, and multiple airline designation. Full liberalization of air transport services within COMESA is targeted for October 2000. Also, the Council of Ministers of the Central African Economic Union adopted, in Bangui, an agreement on liberalizing air transport services amongst the 6 member States. The agreement included a two-year programme for progressively exchanging freedoms of the air, beginning with non-scheduled cargo flights.

2.11 Elsewhere, the leaders of the Asia Pacific Economic Cooperation (APEC) forum endorsed a proposal by its Transportation Working Group aimed at increasing competitive air services within the region. The proposal would eliminate restrictions on air freight services and auxiliary airline commercial activities and would allow for multiple airline designation and expansion of cooperative arrangements. The EU and Switzerland signed an air transport agreement based on the following principles: the reciprocal liberalization (relevant EU laws on traffic rights, the "Community acquis"), freedom of establishment as well as consultation and safeguard measures in relation to agreements with third countries and international organizations. The agreement, subject to national ratification procedures and the assent of the European Parliament, would apply to all routes between any point in the EU and any point in the Swiss territory as well as to all carriers registered in Switzerland or in an EU Member State. A draft agreement between the EU and 10 Central and Eastern European States for the creation of a European Common Aviation Area has been drawn up for review by the Transport Ministers.

State aid

2.12 The issue of state aid, particularly as it affects airlines of the EU, appeared to be diminishing in importance. During the year, the European Commission (EC) cleared the last aid payment to Alitalia by the Italian government. The release came only after the Commission was satisfied that conditions, imposed on Alitalia as part of the state aid approval, had been implemented. The Commission also approved in August a capital injection of 120 million Euro to Iberia by the Spanish government in view of its planned privatization. However, the Commission reportedly warned the Greek government that it would again block state aid payments to Olympic Airways if the airline failed to accomplish restructuring. Elsewhere, the Government of India provided 10 billion rupees ($231 million) in aid to Air India to help stabilize the financial situation before the government proceeds with its plan to partially privatize the airline. The Government of Indonesia reportedly promised to provide its flag carrier, Garuda, with an annual cash injection of $62 million over the next eight years to help Garuda's restructuring efforts.

Airport access

2.13 During the past ten years, the growth in commercial air services has continued to outstrip the available capacity at more and more airports. Although many airports with congestion problems are located in Europe, a growing number of airports in other regions are reaching capacity limits. Moreover, because of the interconnected operations of the international air transport system, capacity

constraints at some airports impact on other airports. Environmental, economic, political and physical constraints on increasing airport capacity have, in some instances, exacerbated this problem. Governments, airlines and airports have each developed measures to overcome or ameliorate situations of insufficient airport capacity. However, governments are increasingly likely to face situations where the demand by airlines to initiate or increase commercial operations cannot be met because of a lack of airport capacity. In the light of this, the ICAO Secretariat produced a study on the regulatory implications of slot allocation at airports. The subject of capacity management, including slot allocation, was slated for examination at the ICAO Conference on the Economics of Airports and Air Navigation Services (ANSConf 2000) to be held in June 2000.

2.14 In 1999, congested airports and air traffic management system constraints in Europe resulted in a sharp increase in flight delays and stimulated more calls for improved air traffic control. In December, the EC issued a Communication laying out actions required by Member States to tackle the traffic congestion problems including "the creation of the single European sky" (unified air traffic control). Meanwhile, the lack of airport slots at many major airports continued to be an issue in bilateral relations as well as government approval of airline alliances.

2.15 The EC extended the bloc exemption from competition provisions for slot allocation procedures until June 2001. In the United States, legislation which would phase out the high-density rule at three international airports (Chicago O'Hare, New York-JFK, New York-La Guardia) and at one domestic airport (Washington Reagon) was still pending at the end of the year.

OWNERSHIP, ALLIANCES AND COOPERATION

Privatization

2.16 The trend towards partial or full privatization of government-owned airlines continued in 1999. Preparations for privatization continued for some 30 government-owned carriers which had been targeted in previous years, while privatization objectives were announced for another two airlines (see Table 2-1).

2.17 Privatization aims were achieved in 1999 by several airlines, some involving varying degrees of foreign equity investment, including foreign airlines. As part of the privatization plan of South African Airways, the Government of South Africa sold 20 per cent of its stake to SAirGroup, the parent company of Swissair. The Bulgarian government sold 75 per cent of its stake in the national carrier Balkan Bulgarian Airlines to two Israeli companies, Knafalm-Arkia (holding company of Arkia Israeli Airlines) and Zeevi investment group. The Polish government sold 37.6 per cent of its stake in LOT-Polish Airlines to SAirGroup, and planned to further sell up to 49 per cent of its stake in two or three years. The Government of Portugal agreed to sell a 20 per cent stake in its national carrier TAP-Air Portugal also to SAirGroup, which has the option of raising its stake to 30 per cent within the next four years. The Government of Greece agreed to sell a 20 per cent stake in its national carrier Olympic Airways to British Airways. The French government started privatization of its national carrier Air France through the stock market; ultimately, it planned to reduce its stake in the carrier from 94

per cent to 53 per cent. The Spanish government agreed to sell 40 per cent of its stake in its national carrier, Iberia, to seven strategic investors, including British Airways (9 per cent) and American Airlines (1 per cent); another 50 per cent of its stake is expected to be sold in 2000 through public sale. The Government of Senegal achieved its privatization aim by selling 51 per cent of its stake in Air Senegal to Royal Air Maroc of Morocco.

2.18 Preparatory stages of airline privatizations were also reported. In Africa, the Government of Madagascar invited bids from strategic investors to privatize its national carrier Air Madagascar. The governments of 11 African States which jointly own Air Afrique agreed to reduce their shareholding in the multi-national carrier from 68.4 to 33 per cent with the aim of completing the privatization process by June 2000. The Nigerian government decided to sell its stake in Nigeria Airways to both foreign (40 per cent) and local investors (20 per cent). Furthermore, preparations were undertaken by three additional African Governments to privatize their respective national carriers: Air Namibia within five years, Air Zimbabwe by October 2000 and Sudan Airways. To advance the long delayed privatization of its national carrier Uganda Airlines, the Government of Uganda was considering to sell a 49 per cent of its stake to South African Airways. The Government of Morocco planned to sell up to 40 per cent out of 93 per cent of its stake in Royal Air Maroc.

2.19 In Asia/Pacific, the Government of Bangladesh announced its plan for the national carrier Biman Bangladesh Airlines to be privatized by mid-2000, while the Indian government decided to sell 49 per cent of its stake in Indian Airlines and 40 per cent of its stake in Air India. The Indonesian government was reportedly planning to sell a minority stake in its national carrier Garuda Indonesia in 2003. The Thai government decided to sell 23 per cent of its 93 per cent stake in Thai Airways International with an ultimate goal of reducing its stake in the carrier to less than 50 per cent. It was also reported that the Government of Vanuatu decided to sell 49 per cent of its stake in Air Vanuatu.

2.20 In Europe, the Austrian government revived its plan to privatize Austrian Airlines through reducing its stake to 39 per cent from 51.9 per cent. The Government of Ireland announced its plan to sell 95 per cent of Aer Lingus, a measure that may pave the way for the carrier to join the oneworld alliance. The Hungarian government planned to sell up to 70 per cent of MALEV Hungarian Airlines to international and local investors in 2000. In the Baltic States, the Government of Lithuania was preparing to sell 49 per cent of Lithuanian Airlines and the Government of Latvia to privatize Air Baltic. The Turkish government took steps to reduce its ownership in THY-Turkish Airlines. The Government of Cyprus planned to relinquish its majority shareholder status (82 per cent) in Cyprus Airways, but its initial attempt to sell a 10 per cent stake in the carrier failed.

2.21 In the Middle East, the Jordanian government approved plans to privatize up to 49 per cent of Royal Jordanian by early 2000, while the Government of Kuwait continued to prepare for partial privatization of Kuwait Airways. The Government of Lebanon was considering the privatization of Middle East Airlines. The Saudi Arabian government formed a committee to prepare for the privatization of its national carrier Saudi Arabian Airlines.

2.22 During the year, however, the privatization plans of Air Pacific of Fiji, Czech Air and Myanmar Airways International had to be abandoned or postponed. Among the obstacles were reluctance of the government concerned to lose control of its national carrier, the impact of an unfavourable financial and economic situation, or international political circumstances. In contrast to the general trend, the

Government of Qatar purchased a 50 per cent stake in the privately-owned Qatar Airways, paving the way for the carrier to assume national carrier status instead of Gulf Air which is jointly owned by four governments (Qatar, Bahrain, Oman and United Arab Emirates).

2.23 Since the early 1990s, over 85 air carriers have been targeted for partial or full privatization (14 in the last three years). By the end of 1999, 31 of the targeted airlines had achieved their privatization aims while nearly 30 were currently 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.

Table 2-1. Government-owned airlines targeted for partial or full privatization (1999)

Targeted during 1999	Targeted before 1999 and progress reported	Aim achieved during 1999
Air Namibia	Air Afrique	Air France
Air Vanuatu	Air Baltic	Air Senegal
	Air China	Balkan-Bulgarian Airlines
	Air India	Iberia
	Air Lingus	LOT-Polish Airlines
	Air Madagascar	Olympic Airways
	Air Zimbabwe	South African Airways
	Alitalia	
	Austrian Airlines	
	Biman Bangladesh	
	Cyprus Airways	
	El Al (Israel)	
	Garuda	
	Indian Airlines	
	Kuwait Airlines	
	Lithuanian Airlines	
	MALEV-Hungarian Airlines	
	Nigeria Airlines	
	Royal Air Maroc	
	Royal Jordanian	
	Saudi Arabian Airlines	
	Sudan Airways	
	TAP-Air Portugal	
	Thai Airways International	
	THY-Turkish Airlines	
	Uganda Airlines	

National consolidation

2.24 In 1999, the reported developments in airline consolidation at the national level included the takeover of Canadian Airlines by Air Canada, securing nearly 80 per cent of Canada's domestic airline market. These two major Canadian carriers had long been fierce competitors and each was a founding member of the two competing global alliances (Air Canada belongs to Star Alliance and Canadian Airlines to oneworld). In approving the takeover, the Canadian government imposed several conditions to protect competition, employees and air services to small communities. In a separate action, two Air Canada connectors, Air Alliance and Air Nova, decided to combine their operations under Air Alliance to reduce costs and improve schedules.

2.25 The Civil Aviation Administration of China was reported to be studying a long-term plan to consolidate the country's 34 airlines into 3 to 5 corporate groups. Airline consolidation is intended to help prepare for a more competitive marketplace, particularly when China joins the World Trade Organization (WTO). Brazil's four major airlines, Varig, VASP, TAM and TransBrasil, were also reported to be considering various conjunctions in an effort to overcome their financial difficulties.

2.26 The year also saw major airlines in some other States launch mergers or takeovers of, mostly, smaller regional airlines. In the United Kingdom, the British government approved the purchase of CityFlyer Express by British Airways (BA) on condition that BA would limit its take-off and landing slots at Gatwick airport; on the charter front, JMC Airlines merged Caledonian Airways and Flying Colours. French regional carrier Proteus Air System finalized the take-over of its competitor Flandre Air. Aegean Aviation of Greece merged with Air Greece to create the largest private Greek airline. In the United States, AMR Corp., the parent company of American Airlines and American Eagle Airlines, acquired Business Express Airlines which would eventually be merged into American Eagle Airlines. Delta Air Lines completed the acquisition of its Delta Connection carriers, Atlantic Southeast Airlines and Comair. Continental Airlines purchased a 28 per cent stake in Gulfstream International Airlines based in Florida. UPS bought Miami-based all-cargo carrier Challenge Air Cargo. In Argentina, Aerolineas Argentinas was reported to merge with the regional carrier, Austral as part of its restructuring plans. In the Taiwan Province of China, EVA Air merged its three subsidiaries, Great China Airlines, Taiwan Airways and Uni Air, to form Uni Airways.

Transnational ownership

2.27 During 1999, the trend towards partial foreign ownership of airlines continued. Several governments adopted a new policy or amended existing rules on foreign investment or control in national carriers. The Australian government amended rules on foreign investment in its national carriers. Before the amendment, the limits on foreign ownership in its international carriers, other than Qantas Airways, were 25 per cent for a single owner and 35 per cent in total, and in its domestic carriers 25 per cent for a single owner and 40 per cent in total. Under the revised rules, all the limits on ownership of national carriers, other than Qantas Airways, were scrapped, except for an overall 49 per cent rule for its international carriers. Qantas Airways is covered by a separate legislation under which no single foreigner can own more than 25 per cent, total foreign carrier equity holdings are capped at 35 per cent and total foreign ownership is limited to 49 per cent. The Australian government,

however, could still block an acquisition falling within these limits if it found it "contrary to the national interest". In a separate action, the Australian government approved the plan of Virgin Atlantic, the parent company of Virgin Atlantic Airways, to set up a domestic carrier in Australia, which would be treated as an Australian operator. The Greek parliament approved legislation allowing a foreign company to manage its state-owned Olympic Airways; subsequently, British Airways' Speedwing unit was selected to manage the carrier with an option to buy as much as 20 per cent within one year of signing the contract. The Government of Gabon announced its intention to sell a controlling stake in Air Gabon to a major foreign airline.

2.28 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. In Asia/Pacific, Singapore Airlines bought a 49 per cent stake in Virgin Atlantic, and also a 40 per cent stake in Air Mekong, a new Vietnamese freighter carrier.

2.29 In Europe, SAirGroup continued to be active in investing in other carriers. It purchased a 20 per cent stake in South African Airways, a 34 per cent stake in TAP Air Portugal, a 42 per cent stake in Portugalia, and a minority stake in AOM of France. It also increased its shareholding in Sabena of Belgium from 49.5 per cent to 62.5 per cent, making Sabena the first foreign-controlled European scheduled airline. To bolster its connections to Eastern Europe, SAirGroup bought a 37.6 per cent stake in LOT Polish Airlines and was reported to be discussing possible investments in MALEV Hungarian Airlines and Turkish Airlines. Lufthansa signed a broad commercial agreement with Italian regional carrier Air Dolomiti and bought a 26 per cent stake in the latter. SAS increased its stake in Air Baltic of Latvia to 34 per cent.

Transnational alliances

2.30 During 1999, 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 to increase traffic feed and to adapt to an increasingly competitive environment. While airlines continued to sign agreements targeted on specific routes or fields of cooperation, more wide-ranging strategic alliance arrangements were on the rise. Overall, airline alliances are widespread but still evolving, with partnership relations becoming more intertwined and complex.

2.31 The year saw continued formation and expansion of competing "global alliance" groupings. Each group is composed of some major airline members based in different continents with fairly extensive networks. Through the alliances, these carriers have combined their route networks and together reportedly carried nearly 50 per cent of the world scheduled passenger traffic. Several existing alliance groupings continued to streamline their operations through launching of joint fares, products and services, joint purchasing and management. The expansion and raised level of consolidation within each global alliance and the competition between them raised increasing regulatory concerns in terms of potential adverse impact on competition and consumers.

2.32 The Star Alliance group, which was founded in 1997 by United Airlines, Lufthansa, Air Canada, Scandinavian Airlines System, Thai Airways International and subsequently joined by Varig

of Brazil, Ansett Australia and Air New Zealand, continued to attract new members. All Nippon Airways of Japan became a member in October and Mexicana will join in 2000. British Midland Airways sold half of the 40 per cent stake held by SAS to Lufthansa and started code sharing with Lufthansa as a step towards joining the group in 2000. Spanair of Spain also signed a strategic cooperation agreement with Lufthansa, including code sharing, maintenance, pilot training, freight and catering, and announced its intention to join the alliance. Austrian Airlines and its affiliates, Lauda Air and Tyrolean Airways, decided to leave the Atlantic Excellence Alliance to join the Star Alliance. Singapore Airlines (SIA) confirmed its intention to join the Star Alliance, while its former partners Swissair and Delta Air Lines sold their stakes in SIA. Other partnerships forged by members of the Star Alliance include: a cooperation pact signed by Lufthansa with French carrier Regional Airlines, a code-sharing agreement signed by United with ALM of Netherlands Antilles, Air Canada with BWIA of Trinidad and Tobago, and Air New Zealand with Polar Air Cargo.

2.33 The oneworld alliance, which was formed in 1998 by British Airways and American Airlines, Canadian Airlines International, Cathay Pacific Airways and Qantas Airways, and subsequently joined by Finnair, increased its membership to seven by adding Iberia. The group was expected to expand with Aer Lingus and LanChile, both planning to join in early 2000. Japan Airlines moved closer to the alliance by replacing its code-sharing agreement with KLM with one for the same routes with Iberia, and by signing a code-sharing and marketing agreement with British Airways. American Airlines formed code-sharing alliances with EVA of the Taiwan Province of China, Fiji's Air Pacific and Finnair of Finland.

2.34 Another global alliance, dubbed as Wings and led by the long-established and wide-ranging partnership of Northwest Airlines and KLM, was also gaining strength by adding new partners, notably Alitalia and Continental Airlines. The boards of KLM and Alitalia approved a “virtual merger” of their managements and fleets under a single unified management structure thereby creating Europe's largest passenger airline. KLM's Norwegian partner Braathens was also to be included in Wings as well as Air Europa of Spain. Malaysian Airlines System moved a step closer to membership in the alliance by forging links with all three main partners in the group. Northwest Airlines and Japan Air System started code sharing which marked the beginning of a larger alliance relationship between the two carriers.

2.35 In June, Air France and Delta Air Lines signed an agreement for an “exclusive long-term global alliance”, which was subsequently joined by Mexico's largest carrier AeroMexico. By linking their routes in Europe, North America and Latin America, the three carriers made up the foundation of a new global alliance to compete with the other groups. Korean Air was reported to have also secured a place in the alliance. The group was reported to be expecting the future alliance to number around no more than six or seven carriers to avoid overburdening complexity.

2.36 In contrast, the Atlantic Excellence Alliance, formerly led by Delta Air Lines and Swissair, was dismantled as Delta Air Lines formed the new alliance with Air France and Austrian Airlines left the group to join the Star Alliance. Also, the Swissair-led Qualiflyer group lost its long-term partnership with Austrian Airlines and its affiliates, Lauda Air and Tyrolean Airways, which joined the Star Alliance. However, the Qualiflyer group, with eight remaining members (Swissair, Sabena, Turkish Airlines, TAP Air Portugal, AOM and Air Littoral of France, Crossair and Air Europe), forged new partnerships, including LOT Polish Airlines by 2000 and possibly MALEV Hungarian Airlines. SAirGroup's purchase of a 20 per cent stake in South African Airways was seen as a move to expand

the current European alliance to a global one. American Airlines agreed to expand its relationship with Swissair and Sabena through code sharing and cooperation in frequent flyer programmes.

2.37 While most of the global alliances are mainly focussed on passenger business, the year also saw a number of major air cargo partnerships formed. Singapore Airlines, SAS and Lufthansa signed a memorandum of understanding for closer cooperation in the cargo business to boost their market share by possibly combining marketing, information systems and even fleets. Lufthansa also formed a joint cargo venture with Philippine Airlines. KLM Cargo disclosed plans for a global cargo alliance which would include setting up a separate cargo airline in the next few years with its alliance partners Northwest Airlines and Alitalia.

2.38 Along with the expansion of global alliances, moves to form alliances at the regional level were also taking place, either as preparation to integrate into a global grouping at a later stage or to compete better against the global alliances. Ghana Airways signed Memoranda of Understanding with South African Airways and Ethiopian Airways, pursuing a strategy to start off with regional alliances before embarking on intercontinental alliances. In South-East Asia, a regional alliance was formed by six regional carriers, Angel Air, Bangkok Airways, Lao Aviation, Myanmar Airways International, Royal Air Cambodia and Vietnam Airlines, serving the Mekong area (encompassing Cambodia, Laos, Myanmar, Vietnam and Northern Thailand); code sharing, interlining and flight scheduling were among the areas of planned cooperation of the fledgling alliance. In the Middle East, Gulf Air, Emirates Airlines, Saudi Arabian Airlines, Oman Airways and Qatar Airways held talks to form an alliance, including future cooperation on developing revenues, cutting costs and joint investment. Elsewhere, several Caribbean carriers (Air Aruba, ASERCA Airlines of Venezuela and Curacao-based Air ALM) formed a strategic alliance aimed at increasing their combined market share and reducing costs; the agreement included code sharing and cooperation in marketing, sales, operation and maintenance.

2.39 Other reported significant developments include: Aeroflot signed a cooperation agreement with British Airways. Virgin Atlantic Airways signed an alliance agreement with Air India, and also signed a letter of intent to form a marketing relationship with Air Jamaica. Continental Airlines started a broad strategic marketing alliance with both Alaska Airlines and Alaska's regional subsidiary, Horizon Air. Trans World Airlines entered a code-sharing partnership with Kuwait Airways similar to its marketing partnership with Royal Jordanian Airlines and Royal Air Maroc. In Asia/Pacific, Malaysian Airlines System signed code-sharing agreements with Korean Air, Philippine Airlines, SriLankan Airlines, and Uzbekistan Airways. Elsewhere, South African Airways, in addition to the MOU with Ghana Airways, signed cooperation agreements with Air France, Air Namibia, British Midland Airways and Cathay Pacific Airways. Emirates Airlines concluded separate code-sharing agreements with Libyan Arab Airways, SriLankan Airlines and Philippine Airlines, while Bahrain-based Gulf Air signed code-sharing agreements with Air Tanzania and Uganda Airlines. El Al of Israel concluded separate code-sharing agreements with Thai Airways International, LOT of Poland, Iberia and Sabena, as well as a reciprocal frequent flyer agreement with American Airlines.

2.40 Transnational airline alliances, especially major ones, continued to attract attention from regulatory authorities because of their potential impact on market access, competition and consumer protection. Some proposed major alliances received close examination by relevant national and regional regulatory bodies and in some cases, certain regulatory measures were introduced to ameliorate the anti-competitive aspects of the arrangements. During the year, the European

Commission continued to review some major alliances after receiving complaints against its initial ruling on the proposed alliance between British Airways and American Airlines and on the United Airlines, Lufthansa and SAS alliance, and reportedly launched new investigations into the expansion of some existing alliances such as the Star Alliance. The United States DOT established a monitoring programme on the impacts of domestic alliances on market share and fares.

FARES AND RATES

Tariff Establishment

2.41 In 1999, the IATA multilateral tariff coordination machinery continued to function against the 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.

2.42 The European Commission, in 1993, had granted a block exemption from certain aspects of European Community (EU) competition law requirements which allowed airlines of the EU Member States to continue to participate in IATA passenger and cargo tariff coordination on intra-EU routes, provided that such tariff consultations were aimed at facilitating interlining. The exemption authorized had a five-year validity and was due to expire on 30 June 1998. In 1996, the Commission had issued a regulation to amend the block exemption which would prohibit the EU carriers from participating in IATA cargo tariff consultation from July 1997. IATA subsequently submitted an application for an individual exemption for such tariff consultations. On 27 May 1999, the Commission issued a new regulation granting an extension of the current exemption for passenger tariff consultations for another three years from 1 July 1998 to 30 June 2001. The cargo tariff consultations, meanwhile, were allowed to continue until such time as the Commission acts upon IATA's application.

2.43 During the year, IATA continued to adjust its tariff coordination process and structure to adapt to the changing regulatory and operating environment. IATA had developed a plan in 1998 to introduce significant changes to its tariff conference structure and process. In June 1999, the IATA Annual General Meeting formally approved the transformation plan, including a change to its assessment structure to be implemented from 1 January 2000. This change *de facto* eliminates the separate assessment for airlines wishing to participate in IATA's tariff activities in favour of cost determination according to services rendered. A special working group was also set up by IATA to undertake further work on developing recommendations to modernize the tariff conference process with a goal of implementation from 1 January 2001. In separate action, after receiving the necessary government approval of the new fare construction rules for normal fares adopted in 1996, IATA member airlines agreed to implement the new rules for normal fares from 1 June 2000.

2.44 In 1999, there were no major changes in the IATA fares and rates level and structure although some adjustments were agreed in certain markets to address local requirements.

2.45 In recent years, the advancement of information technology and its expanding use by the business community as well as the general public has had an increasing impact on the way the airlines market and sell their products, and consequently develop their tariff rules. The growing number of sales of airline tickets via the Internet and the use of the electronic ticketing facility have presented a new challenge to the airline industry. A major problem faced by the airlines in dealing with this activity is the difficulty in identifying the point of sale when a ticket is purchased via the Internet. This has implications for fare calculation, the application of relevant fare conditions and the collection of taxes. As electronic selling and ticketing activity becomes common in major markets and spreads quickly into other regions of the world, it represents a serious problem for IATA tariff coordination. Recognizing the potential negative impact of this trend and the need for the industry to address the issue, IATA in 1999 established a multi-disciplinary group to develop relevant strategies to meet this challenge.

PRODUCT DISTRIBUTION

2.46 In 1999, the four global computer reservation systems (CRSs) continued to adjust to the changing operating environment and recorded an increase in total bookings. In the Middle East, the Arab Civil Aviation Commission (ACAC) adopted a Code of Conduct for CRSs while regulatory authorities in Europe and the United States revised or continued to review their respective CRS regulations. Travel agents, however, continued to face difficult times due to commission cuts and caps as well as the increased popularity with air travellers of booking and ticketing directly via the Internet.

Computer reservation systems

2.47 The year saw a nearly 6 per cent increase in the total number of air segments reportedly booked by the four global CRSs – Amadeus, Galileo, Sabre, and Worldspan, while the market shares of the respective CRS vendors remained relatively unchanged from the previous year. Except for Sabre which reported a small decline, the other three global vendors recorded increases in their travel agency locations on a worldwide basis with individual growth ranging from 2.9 to 9.8 per cent. The surge in reported CRS bookings seemed to suggest that the vendors have adapted quite well to challenges posed by the fast growing use of the Internet for booking air travel. All four major systems pursued the Internet market aggressively through different strategies. Amadeus forged a Web deal with retail giant Wal-Mart, while Sabre was behind one of the leading on-line travel sites, “Travelocity.com”, and planned to take over another site, “Preview Travel”. Worldspan provided reservation services to some of the other major on-line travel sites including “Expedia.com” and “Priceline.com”. Galileo signed an agreement with “Viajo.com”, a leading Latin American Internet company, to launch Latin America's first full-service travel site in Spanish; Galileo planned to launch its own consumer site in early 2000. The four global CRSs continued to develop or improve programmes to help airline participants and travel agents in their systems to cut down training costs and improve productivity.

2.48 At the corporate level, Amadeus successfully completed the initial public offering of its stock in Madrid and Barcelona in October and subsequently its listing in the Frankfurt Stock Exchange. To keep pace with the developments of airline alliances, Amadeus launched a new alliance-specific

display, enabling alliance airlines to show in a single screen their combined flights on selected routes. Galileo changed its ownership structure as it completed a secondary stock offering, and five of its eleven airline owners shed some or all of their stakes in the company (United, the largest owner, cut its stake from 31.9 to 15.2 per cent; Alitalia reduced its holding from 1.5 to 1 per cent while KLM, US Airways and TAP-Air Portugal sold all their shares; BA and Swissair continued to hold 6.7 per cent each and other airlines less than 1 per cent each). Plans were announced by American Airlines, the airline owner of Sabre, to spin off its 83 per cent shareholding; having entered a joint venture agreement with Abacus, the only other multinational CRS, Sabre continued its expansion in the Asia/Pacific region, concluding an agreement to host Infini, one of the two Japanese CRSs, of which Abacus owned 40 per cent.

2.49 In the regulatory area, the European Union issued a regulation in February amending its 1993 Code of Conduct for CRSs. A noteworthy change in the revised Code 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. The European Civil Aviation Conference (ECAC) commenced work on reviewing its Code of Conduct for CRSs in light of the revised EU Code. During the year, the European Commission opened a formal investigation into alleged discrimination by Air France, which partly owns Amadeus, for providing Amadeus with more timely and accurate information for itself than for its competitors as regards domestic and international tariffs between 1992 and 1997. In a separate action, the Commission fined Lufthansa 10,000 Euro for breaching the EU CRS Code of Conduct by not opening to rival CRSs before December 1998 an electronic ticketing function introduced in 1997. The United States Department of Transportation (DOT) continued its review of rules for airline-owned CRSs and, for a second time, extended the effectiveness of the current U.S. CRS rules, on this occasion to 31 March 2000, to allow additional time to complete a comprehensive review.

2.50 At the end of 1999, 31 States either followed the ICAO CRS Code or had CRS regulations which are consistent or compatible with it. Two of these States have invoked the developing country exemption aimed at delaying the entry of foreign vendors into their markets.

Electronic ticketing

2.51 Electronic ticketing increased in popularity during 1999 as more airlines introduced the practice on selected routes or expanded the capability for additional countries. Major CRS vendors introduced new enhancements to their electronic ticketing products to be launched worldwide. According to the Airline Reporting Corporation (ARC) which manages travel agents' transactions with air carriers in the United States, a fast growth in electronic ticketing continued there in 1999. Over 32 per cent of all airline transactions reported by travel agencies to ARC in mid-1999 were electronic, compared with 14 per cent at the beginning of the year. The ARC predicted that at least 50 per cent of agents' transactions would be electronic by the end of the year. In May, 51 per cent of all tickets used by United Airlines' customers worldwide were electronic tickets – the first time that a majority of its customers had used electronic tickets since the service began in 1994. Continental Airlines reportedly hoped to eliminate paper tickets in two or three years. American Airlines and Canadian Airlines concluded an electronic ticket interline agreement to become the first carriers in the industry

to issue electronic tickets for each other. The Qualiflyer group, led by Swissair, was reported to launch a joint electronic ticketing facility as the first initiative of its kind by an airline alliance. In addition to the clear benefits of electronic ticketing to airlines in cutting the distribution costs, the General Accounting Office of the United States reported that the problem of ticket stock theft, long a source of friction between airlines and travel agencies, may resolve itself with the increasing use of electronic ticketing.

2.52 In August, the International Air Transport Association (IATA) announced a plan to develop a centralized electronic ticketing system with International Business Machines Corp. (IBM). Targeted for launch in June 2000, the service is expected to "expand significantly" the use of electronic ticketing among airlines worldwide and the travel industry as a whole. IATA member airlines with no electronic ticketing capability can use the centralized service as a host system to create, store and process electronic tickets. IATA believes that by 2010 the majority of airline tickets in the world will be electronic and that in the United States 80 per cent of tickets will be electronic.

Travel agents

2.53 Travel agents continued to face difficult times during 1999 due not only to the reduction in commissions but also to the fast growing competition from alternative product distribution via the Internet and direct airline sales. Major airlines worldwide continued to lower commissions paid to travel agents for the sale of their tickets; base commission rates were cut and caps on commission payments established. Among the reported developments were intentions by Singapore Airlines and British Airways to abolish commissions, and by most of the major U.S. carriers to reduce base commission rates to 5 per cent while keeping the caps in place. By October, the ARC average domestic commission rate had sunk to 5.51 per cent, the lowest rate at the point of sale in more than two decades. The average international commission rate in the United States sank to 12.06 from the previous year's 14.94 per cent.

2.54 According to a report from the U.S. General Accounting Office, travel agencies would have earned up to $4.3 billion more between 1995 and 1998 if domestic and international commission rates had retained their peak levels. The reduction of commissions accelerated agency changes toward product specialization, operational efficiencies and the establishment of passenger service fees, and increased the importance of commission overrides to travel agents.

2.55 With the prevalence of commission cuts among airlines, there was considerable reaction from travel agents including threats of boycott and legal actions, as well as government intervention. In a test case involving British Airways (BA), Virgin Atlantic and Lufthansa, a United Kingdom High Court ruled that airlines could not call the airport passenger service charges a "tax" and separate them from the rest of the ticket price to avoid commission on them. In July, in a case against BA's incentive schemes for travel agents which involved extra commission payments in return for agents meeting or exceeding their previous year's sales of BA tickets, the European Commission concluded that BA had abused its dominant position in the UK market and fined it 6.8 million Euros ($7.1 million). To avoid conflicts with EU competition laws in the future, BA and the Commission identified and agreed on a set of principles that will establish clear guidance for other airlines in a similar situation. The principles stipulate that the levels of commission paid to travel agents must reflect only variations in the costs of

distribution or in the value of services provided. Commission levels must not have targets expressed by reference to the sales made by the agents in a preceding period. In addition, agents must be free to sell the tickets of any other airline and the goods or services supplied by the third party. Separately, the EC competition authorities had reportedly begun investigation into commission payments to travel agents by eight other European carriers (Air France, Alitalia, Austrian Airlines, KLM, Lufthansa, Sabena, SAS and Olympic Airways).

2.56 The Office of Inspector General of the U.S. DOT reported that commission overrides or other financial incentives based on ticket sales transform the role of travel agents from that of neutral sellers toward one of a direct distribution agent for a particular airline. Such incentives may influence airline competition by contributing to increased market concentration by major carriers, higher fares, fewer choices in routes and scheduling, and other potential anti-competitive effects. The report recommended that the authorities establish a rule for travel agencies to disclose to consumers, before booking reservations or finalizing flight purchases, the existence of overrides or other ticket sales-based financial incentives from airlines, and the use of CRS enhancement software that is designed to bias screen displays toward the flight information of an override carrier.

Internet

2.57 Although the majority of airline ticket sales are still being done through traditional travel agents, the share of on-line sales through the Internet is growing fast, especially in countries where Internet and credit card use is high. It was reported that U.S. consumers spent $7 billion, or about 3 per cent of all travel purchased, on travel booked through the Internet in 1999, up from $2.6 billion in 1998. By the year 2001, that portion was expected to climb to more than $20 billion or 8 per cent of all travel. Approximately 3 to 5 per cent of U.S. airline revenues in 1999 came from passengers booking flights on the Internet.

2.58 Several airlines started or expanded on-line sales as a way of cutting distribution costs, accompanied by redesign of their Web sites. In order to attract passengers to their Web sites, many airlines are offering bonus frequent flyer points, discount fares and e-mail specials through their on-line sales. Some airlines, for example, America West, British Airways, and United Airlines, created separate e-commerce units which focus on the Internet activities. British Airways was reported as setting a goal to sell 50 per cent of its tickets on-line by 2003. The use of the Internet is also being extended to include on-line check-in where passengers can check in and print their own boarding pass at their home or office. Alaska Airlines developed a new on-line check-in system for travellers who purchase electronic tickets for domestic travel from its Web site, to become the first airline to offer online check-in via the Internet.

2.59 In November, four major U.S. airlines (Continental Airlines, Delta Air Lines, Northwest Airlines and United Airlines) joined forces to create a travel Web site. Targeted to launch in the first half of 2000, the Web site will reportedly seek to sell airline tickets as well as other travel-related products with on-line discounts. Twenty-three other U.S. and foreign airlines signed letters of intent to join the new Web site as “charter associates”. The plan, however, sparked an immediate reaction from The American Society of Travel Agents (ASTA) and Association of Retail Travel Agents (ARTA), which expressed concern about the possible anti-competitive impact of such a Web site.

TRAFFIC

2.60 Indicators are given below of the development of airline scheduled traffic in 1999, 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

2.61 The total scheduled traffic (domestic plus international) carried by the airlines of the 185 Contracting States of ICAO in 1999 is estimated at about 369 billion tonne-kilometres performed, an increase of about 6 per cent over 1998. The airlines carried a total of about 1 558 million passengers and some 28 million tonnes of freight in 1999, compared with 1 471 million passengers and 26 million tonnes of freight in 1998 (Table 2-2). In 1999, the overall capacity increased at a slightly lower rate than traffic, hence the average passenger load factor on total scheduled services (domestic plus international) shows a slight increase to 69 per cent in 1999, however, there was little change in the average aircraft load factor which remained at 60 per cent.

2.62 Compared with previous years, in 1999 international scheduled traffic showed increases of about 6 per cent in tonne- kilometres performed, almost 7 per cent in passengers carried, and some 9 per cent in freight tonnes carried. International traffic accounted for some 58 per cent of total passenger-kilometres performed, 86 per cent of the freight tonne-kilometres performed and some 67 per cent of the total tonne-kilometres performed.

2.63 Domestic traffic increased about 5 per cent, with some 123 billion tonne-kilometres performed in 1999 against 117 billion tonne-kilometres performed in 1998.

Scheduled: regional breakdown

2.64 From 1998 to 1999, development in total and international scheduled traffic varied considerably among regions of carrier registration with respect to both passengers and freight. In terms of passenger-kilometres performed, the change in traffic ranged from little change in total traffic and a decrease of over 1 per cent in international traffic for the airlines registered in Latin America and the Caribbean to increases of about 9 and 10 per cent in total and international traffic respectively for airlines registered in Africa (Table 2-3). In terms of freight tonne-kilometres performed, carriers registered in Latin America and the Caribbean showed a significant decrease both in total and in international traffic (down 10 and 12 per cent respectively). At the other end of the scale, carriers registered in Africa showed increases in total and in international freight tonne-kilometres performed of about 11 per cent each.

2.65 The differences in regional traffic development between 1998 and 1999 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 1999, the airlines of North America carried about 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.

2.66 In 1999, airlines registered in Asia/Pacific 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 48 per cent). Compared with 1999, the weight load factors for international scheduled services (shown in Table A1-1 in Appendix 1) represent an increase of about three percentage points for the airlines of Asia/Pacific, a decrease of one percentage point for airlines of Africa and little or no change for those of the remaining regions.

Scheduled: carrier rankings

2.67 Table 2-4 shows the top 30 air carriers in the world in 1999 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 1998 and in 1990. Table 2-5 shows the top 30 air carrier rankings according to the same parameters but in terms of international scheduled traffic.

2.68 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 1990-1999 (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 1990, 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 1999, 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 1999 China had over a dozen international carriers.

Scheduled: country rankings

2.69 Rankings for the top 30 countries or groups of countries by volume of scheduled traffic generated by their airlines in 1999, 1998 and 1990 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 1999 approximately 46 per cent of the total volume of scheduled passenger, freight and mail traffic was accounted for by the airlines of the United States, Japan and the United Kingdom (34, 6 and 6 per cent respectively). On international services, about 40 per cent of all traffic was carried by the airlines of the United States, the United Kingdom, Germany and Japan (18, 8, 7 and 7 per cent respectively).

Non-scheduled

2.70 It is estimated that in 1999 total international non-scheduled passenger-kilometres performed throughout the world increased by an estimated 11 per cent (Table 2-8) with the share of such traffic in overall international air passenger traffic remaining around 14 per cent. Non-scheduled traffic in Europe remains the largest single component of the world charter market. Domestic non-scheduled passenger traffic is estimated to represent some 8 per cent of total non-scheduled passenger traffic and about 2 per cent of total domestic passenger traffic worldwide. Non-scheduled cargo operations tend to be largely of an *ad hoc* nature and little information is available as to their volume.

FLEETS

2.71 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.

Orders and deliveries

2.72 In 1999, 987 turbo-jet aircraft were ordered compared with 1 463 in 1998. The financial commitment represented by orders placed with the major aircraft manufacturers in 1999 for these aircraft is estimated to be about $51 billion. In 1999, 1 074 aircraft were delivered, compared with 929 in 1998. The backlog of unfilled orders decreased from 3 565 aircraft at the end of 1998 to 3 306 aircraft at the end of 1999. The status of orders and deliveries for the year 1999 is shown in Table A1-2 in Appendix 1, which gives data by manufacturer and model for turbo-jet and turboprop aircraft.

2.73 The turbo-jet types shown in Table 2-9 were most active in 1999 in terms of orders and deliveries, accounting for about 76 per cent of the orders, 62 per cent of the deliveries made, and 71 per cent of the backlog of unfilled orders. The number of turboprop aircraft ordered in 1999 was 86, and 79 aircraft were delivered during the year. The backlog of turboprop aircraft was 80 at the end of the year.

Composition

2.74 Between 1990 and 1999, 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 49 per cent, from 12 238 to 18 204, as shown in Table 2-10. During this period, the number of jet aircraft increased from 9 407 to 14 406, rising from about 77 per cent to 79 per cent of the fleet, while turboprop aircraft increased from 2 291

to 3 443 , remaining at about 19 cent of the fleet. On the other hand, the number of piston-engined aircraft declined by some 34 per cent, from 540 to 355, and now constitutes some 2 per cent of the total world fleet.

2.75 BACK Information Services reported that, as at the end of 1999, there were 586 western-built commercial jets in storage, compared with 499 jets at the end of the previous year. The number of wide-bodies in storage decreased slightly, 203 against 186 in 1999, with A300s, 747s, D-10s and L1011s accounting for 86 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 third year in a row, from 408 in December 1998 to 459 in December 1999. The availability of wide-bodies was down by 6 to 179.

PERSONNEL

2.76 In 1999 an estimated 2 million employees worked for just under 3 000 commercial air carriers around the world out of which around 500 scheduled airlines employed 1.5 million people. Overall labour productivity (TKPs/per employee) rose at an average 4.5 per cent annually from 1989 to 1999.

2.77 For 1988 and 1998, Figure 2-2 compares the composition of IATA airline personnel by occupational groups (1999 data were not available at the time of writing). The increase in pilots/co-pilots and cabin attendants employed is a direct reflection of the expansion in worldwide air transport services, which rose during that period at 5.1 per cent per annum in terms of total tonne-km performed, and notably at 7.4 per cent on international routes. 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". Despite growing fleets, passenger numbers and air cargo volumes, the share of airport handling staff remained unchanged (thus falling in absolute terms), while the share of maintenance personnel decreased (unchanged in absolute terms). The number of airline personnel required in these functions has been trimmed through technologically-induced productivity gains and sub-contracting to independent corporations; in particular, repair and maintenance functions were streamlined through computer-based diagnostic procedures, exchange of pre-manufactured components and outsourcing to specialized maintenance bases.

2.78 Trade unions in all regions are increasingly concerned about the immediate and long-term effects of both domestic and international airline alliances and formed coalitions within the alliance groupings and beyond. Job security and quality are major concerns in view of cost-cutting strategies among alliance partners, such as consolidation of services and joint purchasing (for example, in aircraft parts and catering) as well as outsourcing. Pledging mutual support in job preservation, the oneworld Cockpit Crew Coalition unites pilots from 11 airlines (American Airlines, British Airways, Cathay Pacific, Canadian Airlines International, Iberia, Finnair and Quantas from the oneworld group and Japan Airlines, Aerolineas Argentinas, Lan Chile and Lot Polish Airlines). The Associations of Star Alliance Pilots continued to address pilot and industry concerns on behalf of nine member airlines (United, Lufthansa, SAS, Varig, Thai Airways, Ansett Australia, Air New Zealand, All Nippon and Air Canada). The pilot groups of the four largest carriers of the Wings alliance (Alitalia, Continental, KLM and Northwest) agreed to cooperate and resist management attempts to use the alliance agreements

in ways that adversely affect the pilots' interests including a fair distribution of flight operations within the alliance. Typically, labour contracts signed during the year provided for wage increases reflecting unions' demands to be rewarded for sacrifices made during times of losses in the airline industry in the first half of the nineties.

FINANCES

Financial results

2.79 Preliminary estimates for 1999 indicate that the world's scheduled airlines as a whole experienced an operating profit of 4.1 per cent of total operating revenues, compared with 5.4 per cent in 1998. The operating revenues of scheduled airlines are tentatively estimated at $306.5 billion in 1999, an increase of about 4 per cent compared with the $295.5 billion earned in 1998. Expressed in United States currency, operating revenues per tonne-kilometre performed decreased from 80.6 cents in 1998 to an estimated 78.9 cents in 1999. The operating expenses for the same airlines are tentatively estimated at $294.0 billion in 1999, an increase of more than 5 per cent over the $279.6 billion incurred in 1998. Operating expenses per tonne-kilometre performed decreased slightly from 76.2 cents in 1998 to 75.6 cents in 1999. Continuing efforts by airlines around the world to reduce their costs contributed to the decline in operating expenses per tonne-kilometre performed despite much higher aviation fuel prices.

2.80 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 1999, the estimated operating profit of about $12.5 billion was lower than the 1998 operating profit of $15.9 billion and in absolute terms is the best annual result since ICAO started recording these data in 1947. The positive operating profit in 1999 reflects a generally healthy economy for most of the year, leading to the strong traffic growth. At the same time capacity increases for passenger services continued to be kept in check and hence the average passenger load factor remained at 69 per cent for total services. However, the soaring fuel prices and a decline in yields (revenues per tonne-kilometre) in the Europe and Latin America/Caribbean regions, have negatively affected the world's airlines financial results. With average fuel prices higher by 22 per cent, airlines are expected to pay around $8 000 million more for aviation fuel in 1999 than in 1998.

2.81 The strong economic situation in the United States had a major impact on financial results in 1999 with airlines based in North America producing more than 60 percent of operating profit. 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. Preliminary data indicate that their operating result in 1999 was a profit of $7.7 billion, lower than the profit of $9.1 billion experienced in 1998. For the airlines of the rest of the world combined, the preliminary estimated operating profit in 1999 is $4.8 billion, significantly lower than the operating profit of $6.8 billion shown for 1998.

2.82 The net result is derived from the operating result by taking into account the non-operating items and taxes. Preliminary estimates suggested that in 1999 the net result for the world's scheduled

airlines would be lower than in 1998 mostly due to higher interest rates and currency exchange losses. Information on both operating and net results over the period 1988-1999 and distribution of operating revenues and expenses by item in 1988 and 1998 can be found in Tables 5-4 and 5-5 in Chapter 5.

2.83 The estimates of the world's scheduled airlines as a whole do not portray the considerable difference in results achieved by individual airlines. In 1998 (complete data were not available for 1999 at the time of production) about 75 per cent of airlines experienced operating profits, with 25 per cent reporting operating losses. On a regional basis, airlines in all ICAO statistical regions experienced positive aggregated operating results in 1998, with operating profits expressed as a percentage of operating revenues ranging from 8.1 per cent for the airlines in North America to almost break even result for those based in Africa. Net results ranged from a surplus of 6.6 per cent of operating revenues for the airlines based in North America to a net loss of 1.6 per cent of operating revenues for those in the Latin America/Caribbean (Figure 2-3).

2.84 Available data on non-scheduled carriers are insufficient to produce accurate financial estimates for 1999. In 1998 the operating revenues of the non-scheduled carriers are tentatively estimated at $8.7 billion compared with 8.4 billion earned in 1997. In 1998 these carriers, as a group, had an operating profit estimated at $0.7 billion and a net result, after taking into account the non-operating items and taxes, of some $0.4 billion.

Consolidated balance sheet

2.85 At the end of the fiscal year 1998 (1999 data were not available at the time of production), the total assets of the scheduled airlines of ICAO Contracting States stood at $362.2 billion, compared with $350.9 billion at the end of the fiscal year 1997 (Table 2-11). Of these, 25 per cent were represented by current assets, some 60 per cent by fixed assets and the remainder by other assets.

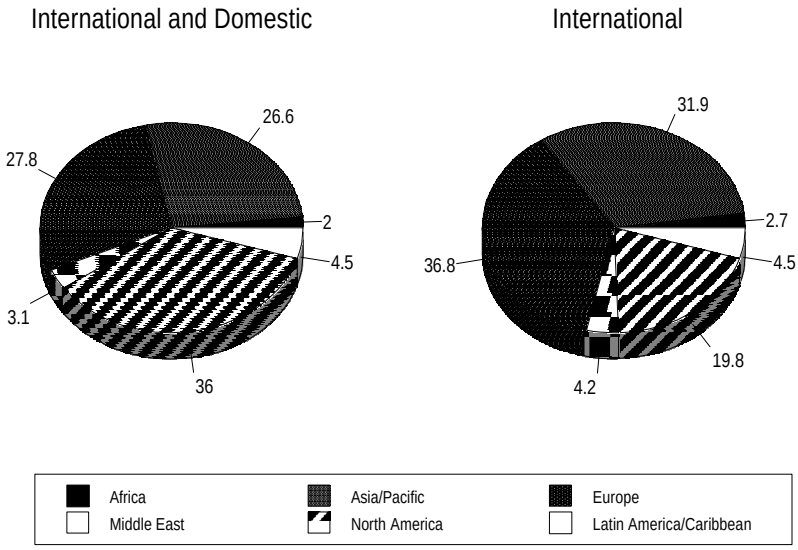
2.86 At the end of 1998, the net value of the aircraft fleet (i.e. after depreciation charges) was $169.9 billion, compared with $161.7 billion at the end of 1997, representing an increase of 5.0 per cent, accounting for about 47 per cent of total assets. Accumulated depreciation charges stood at about $138.2 billion of which $106.7 billion were for the aircraft fleet, representing some 39 per cent of the gross value of the fleet. The remaining accumulated depreciation charges covered ground property and equipment and represented some 50 per cent of their gross value.

2.87 Between the fiscal years 1997 and 1998, the value of stockholders' equity increased by some 8 per cent (from $75.3 billion to $81.2 billion), and in relative terms it increased from 21 to 22 per cent of total liabilities. During the same period long-term debt decreased from $112.3 billion to $107.8 billion and, in relative terms, from 32 to 30 per cent of total liabilities. At the end of the fiscal year 1998 current liabilities, including unearned transportation revenue, stood at $107.3 billion, or some 30 per cent of total liabilities, compared with some 28 per cent in 1997. Hence, during 1998 airlines used some funds to improve their balance sheets by reducing long-term debt. Unearned transportation revenue represented about 6 per cent of total liabilities and some 6 per cent of the total traffic revenue for 1998.

2.88 Long-term trends in the balance sheet elements may be discerned from comparing the figures for 1998 with those for 1990, which are also contained in Table 2-11. At the end of the 1998 fiscal year, total assets stood at $362.2 billion compared with $233.9.0 billion at the end of 1990. Relative to the totals, the most significant difference between 1990 and 1998 is the decrease in the proportion of current assets (from 29 to 25 per cent of the total) and the corresponding increase in other assets. The proportion of fixed assets is increased (from 56 per cent of total assets in 1990 to 59 per cent in 1998); however, there was a slight relative decrease in investment in affiliated companies (from about 4 per cent of total assets in 1990 to 3 per cent in 1998), and a reduction in the relative amounts represented by flight equipment and ground property and equipment.

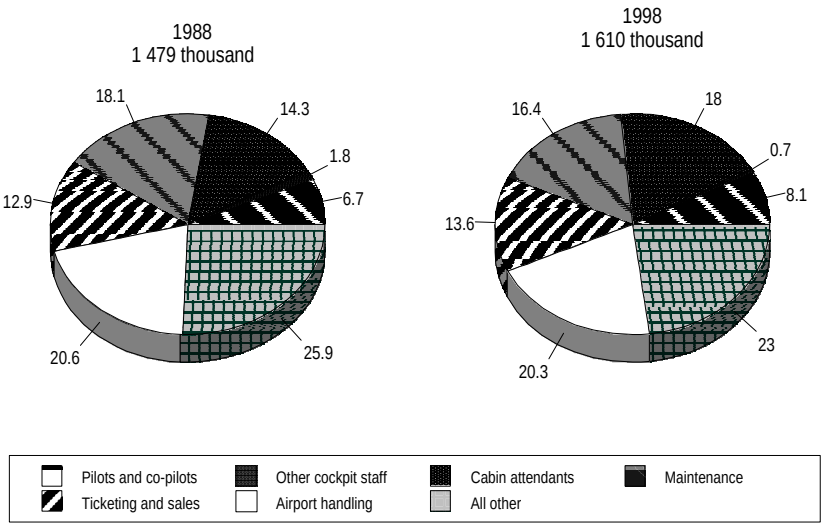
2.89 As regards liabilities, between 1990 and 1998 there was a slight reduction in the proportion of current liabilities including unearned transportation revenue (from 32 to 30 per cent of total liabilities), long-term dept (from 32 to 30 per cent) and a significant increase in stockholders' equity (from 17 to 22 per cent) and advances from affiliated companies and other liabilities. With regard to stockholders' equity, the increase in relative terms was mostly due to the bigger net balance of unappropriated retained earnings (i.e. cumulative profit) at the end of fiscal year 1998.

Chapter 2 Graphs



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 (1999)



Source: IATA.

Figure 2-2. Airline personnel by occupational groups — World (1988 and 1998)

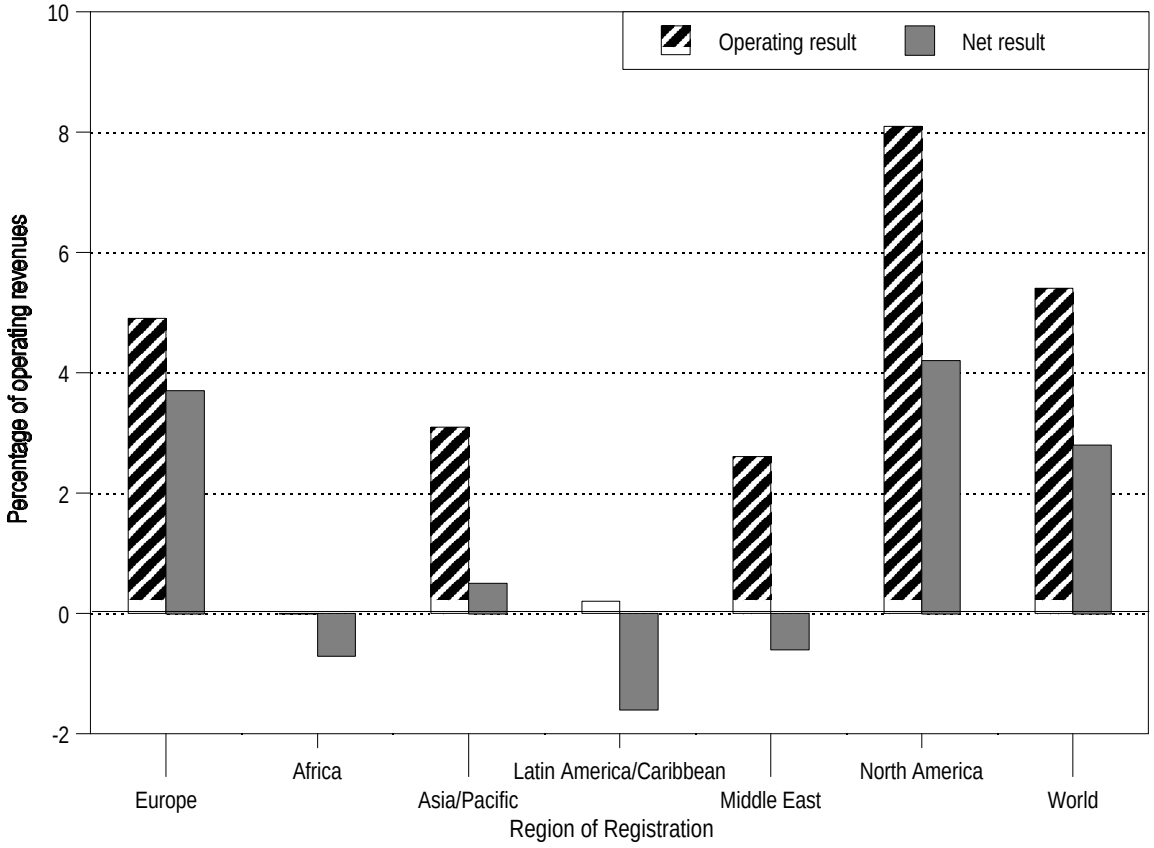


Figure 2-3. Financial results by region — scheduled airlines (1998)

Chapter 2 Tables

Please note that Table 2-1 is found separately on page A-21.

Table 2-2. Scheduled services of airlines of ICAO Contracting States (1999/1998)

	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)								
1998	1 471	2 626 910	68	26.5	101 770	5 770	348 470	60
1999	1 558	2 787 880	69	28.2	108 040	5 700	368 800	60
Percentage change	5.9	6.1	1.0	6.4	6.2	-1.2	5.8	0.0
INTERNATIONAL								
1998	458	1 511 680	69	15.8	87 010	2 480	231 410	62
1999	489	1 613 990	70	17.2	92 680	2 480	246 230	63
Percentage change	6.8	6.8	1.0	8.9	6.5	0.0	6.4	1.0
DOMESTIC								
1998	1013	1 115 230	68	10.7	14 760	3 290	117 060	56
1999	1069	1 173 890	68	11.0	15 360	3 220	122 570	56
Percentage change	5.5	5.3	0.0	2.8	4.1	-2.1	4.7	0.0

Source: ICAO Air Transport Reporting Form A-1.

Table 2-3. Growth of scheduled traffic by region of airline registration: 1999/1998
(annual percentage change)

Region of registration	Passengers carried	Passenger-kilometres	Freight tonne-km performed	Mail tonne-km performed	Total tonne-km performed
TOTAL (international plus domestic)					
Africa	4.5	8.8	11.3	12.0	10.1
Asia and Pacific	5.0	6.9	10.1	3.6	8.4
Europe	6.2	7.3	5.2	-3.3	5.4
Middle East	-1.4	0.8	-0.5	1.4	1.4
North America	7.4	6.0	5.9	-2.0	5.7
Latin America and Caribbean	1.7	-0.3	-10.4	-3.9	-3.4
Total	5.9	6.1	6.2	-1.2	5.8
INTERNATIONAL					
Africa	8.4	10.2	11.0	13.6	11.2
Asia and Pacific	8.0	8.4	10.0	4.6	9.4
Europe	7.5	7.5	5.2	-3.9	5.7
Middle East	1.2	2.5	-0.7	2.9	2.2
North America	5.6	5.6	7.7	-0.3	6.3
Latin America and Caribbean	3.4	-1.4	-11.6	-9.1	-5.5
Total	6.8	6.8	6.5	0.0	6.4

Source: ICAO Air Transport Reporting Form A-1.

Table 2-4. Top 30 scheduled air carriers in 1999 and their ranking in 1998 and 1990 — TOTAL (international and domestic) scheduled traffic carried[1]

Carrier	PASSENGER-KILOMETRES PERFORMED Estimated 1999 (millions)	Ranking 1999	1998	1990	Carrier	FREIGHT AND MAIL TONNE-KILOMETRES PERFORMED Estimated 1999 (millions)	Ranking 1999	1998	1990	Carrier	TOTAL TONNE-KILOMETRES PERFORMED Estimated 1999 (millions	Ranking 1999	1998	1990
United	201 724	1	1	3	Federal Express	10 118	1	1	1	United	22 779	1	1	2
American	177 226	2	2	2	Lufthansa	6 743	2	2	2	American	19 119	2	2	3
Delta	168 461	3	3	4	Korean Air	6 161	3	3	7	Delta	17 840	3	3	5
Northwest	119 297	4	5	5	SIA	5 550	4	4	11	British Airways	15 505	4	4	6
British Airways	113 182	5	4	6	Air France	4 915	5	5	4	Lufthansa	15 371	5	5	8
Continental	93 263	6	6	7	JAL	4 609	6	7	3	Northwest	14 229	6	6	4
Lufthansa	86 137	7	8	12	United	4 475	7	6	10	Air France	12 451	7	7	9
Air France	83 735	8	9	13	British Airways	4 201	8	8	8	JAL	11 994	8	8	7
JAL	82 904	9	7	9	KLM	4 118	9	9	9	SIA	11 711	9	9	15
US Airways	66 720	10	10	8	Cathay Pacific	3 707	10	10	13	Federal Express	10 118	10	10	11
SIA	64 411	11	11	15	Northwest	3 404	11	12	6	KLM	9 982	11	11	16
Qantas	59 249	12	13	17	American	3 037	12	11	12	Korean Air	9 842	12	12	17
Southwest	58 702	13	15	31	Delta	2 554	13	13	15	Continental	9 811	13	13	10
KLM	58 540	14	12	16	Cargolux	2 500	14	14	-	Cathay Pacific	7 631	14	14	18
All Nippon Airways	56 725	15	14	14	Asiana	2 035	15	18	119	Qantas	7 397	15	15	19
TWA	41 849	16	17	10	Nippon Cargo	2 018	16	16	23	US Airways	6 536	16	16	14
Korean Air	41 404	17	20	26	Swissair	1 833	17	15	18	All Nippon Airways	6 290	17	17	20
Cathay Pacific	41 208	18	16	20	Qantas	1 791	18	17	17	Southwest	5 522	18	22	35
Air Canada	38 994	19	18	19	Thai Airways	1 727	19	19	27	Alitalia	5 269	19	18	22
Thai Airways	38 345	20	21	24	United Parcel	1 640	20	21	-	Thai Airways	5 184	20	20	28
Alitalia	36 687	21	19	25	Alitalia	1 637	21	20	16	Swissair	4 950	21	19	26
Iberia	34 602	22	22	22	All Nippon Airways	1 623	22	22	30	Air Canada	4 797	22	21	21
Malaysian Airlines	34 067	23	23	34	Air China	1 488	23	30	-	Malaysian Airlines	4 465	23	24	33
Swissair	31 767	24	24	32	Malaysian Airlines	1 432	24	23	31	TWA	4 173	24	23	12
America West	28 470	25	26	27	Continental	1 348	25	29	19	Iberia	3 849	25	26	23
Canadian	26 319	26	25	23	Air Canada	1 260	26	26	21	Asiana	3 296	26	28	115
Virgin Atlantic	25 031	27	28	58	Polar Air Cargo	1 188	27	24	-	Varig	3 210	27	25	29
Varig	23 273	28	27	29	LAN-Chile	1 140	28	27	44	Canadian	3 131	28	27	25
SAS	21 161	29	29	28	Varig	1 105	29	25	22	Virgin Atlantic	3 127	29	29	54
Air New Zealand	19 879	30	32	36	El Al	1 042	30	28	24	Air China	2 890	30	34	-

1. Most 1999 data are estimates, thus the ranking and the rate of increase or decrease may change when final data become available.

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

Table 2-5. Top 30 scheduled air carriers in 1999 and their ranking in 1998 and 1990 — INTERNATIONAL scheduled traffic carried[1]

PASSENGER-KILOMETRES PERFORMED					FREIGHT AND MAIL TONNE-KILOMETRES PERFORMED					TOTAL TONNE-KILOMETRES PERFORMED				
Carrier	Estimated 1999 (millions)	Ranking 1999	1998	1990	Carrier	Estimated 1999 (millions)	Ranking 1999	1998	1990	Carrier	Estimated 1999 (millions)	Ranking 1999	1998	1990
British Airways	111 076	1	1	1	Lufthansa	6 692	1	1	1	British Airways	15 316	1	1	1
Lufthansa	80 403	2	3	3	Korean Air	6 057	2	2	5	Lufthansa	14 757	2	2	2
United	73 902	3	2	6	SIA	5 550	3	3	8	SIA	11 711	3	4	6
JAL	65 571	4	4	2	Air France	4 776	4	4	3	Air France	10 569	4	3	4
SIA	64 411	5	6	7	JAL	4 281	5	6	2	JAL	10 365	5	6	3
Air France	64 365	6	8	8	British Airways	4 200	6	5	6	KLM	9 981	6	5	7
American	60 882	7	5	12	KLM	4 118	7	7	7	United	9 613	7	7	9
KLM	58 522	8	7	9	Federal Express	3 907	8	8	4	Korean Air	9 378	8	8	10
Northwest	52 835	9	9	5	Cathay Pacific	3 707	9	9	10	Cathay Pacific	7 631	9	10	11
Qantas	44 424	10	10	10	United	2 907	10	10	17	American	7 606	10	9	14
Cathay Pacific	41 208	11	11	11	Cargolux	2 500	11	11	-	Northwest	7 151	11	11	5
Delta	40 024	12	12	21	Northwest	2 357	12	15	9	Qantas	5 809	12	12	12
Korean Air	36 902	13	14	18	American	2 081	13	14	23	Delta	5 122	13	13	25
Thai Airways	35 057	14	13	14	Nippon Cargo	2 018	14	13	15	Swissair	4 930	14	14	17
Continental	31 883	15	18	17	Asiana	2 000	15	16	140	Thai Airways	4 854	15	15	18
Swissair	31 565	16	16	19	Swissair	1 831	16	12	14	Alitalia	4 552	16	16	15
Alitalia	29 574	17	15	16	Thai Airways	1 694	17	18	19	Malaysian Airlines	4 014	17	18	29
Malaysian Airlines	29 253	18	17	27	United Parcel	1 640	18	20	-	Federal Express	3 907	18	17	13
Iberia	25 375	19	20	20	Alitalia	1 624	19	19	12	Continental	3 811	19	20	21
Air Canada	25 326	20	19	23	Qantas	1 609	20	17	11	Air Canada	3 314	20	19	23
Virgin Atlantic	25 031	21	21	42	Delta	1 491	21	21	36	All Nippon Airways	3 242	21	21	37
All Nippon Airways	22 204	22	22	35	Malaysian Airlines	1 376	22	22	27	Virgin Atlantic	3 127	22	23	43
Canadian	18 402	23	23	24	Air China	1 320	23	29	-	Asiana	3 047	23	25	150
Air New Zealand	18 072	24	26	28	All Nippon Airways	1 165	24	28	39	IBERIA	3 000	24	22	19
Sabena	17 692	25	27	32	LAN-Chile	1 096	25	23	42	Air New Zealand	2 606	25	26	32
SAS	16 588	26	25	22	El Al	1 042	26	24	16	Cargolux	2 500	26	27	-
Varig	15 636	27	24	25	Air Canada	1 017	27	27	22	Varig	2 336	27	24	22
South African Airways	14 103	28	31	45	Saudi Arabian Airlines	936	28	30	25	SAS	2 297	28	30	24
Saudi Arabian Airlines	13 357	29	30	26	Continental	918	29	36	30	Canadian	2 285	29	28	26
El Al	13 219	30	32	36	Polar Air Cargo	884	30	26	-	Air China	2 256	30	34	-

1. Most 1999 data are estimates, thus the ranking and the rate of increase or decrease may change when final data become available.

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

Table 2-6. Top 30 countries or group of countries in 1999 and their ranking in 1998 and 1990 — 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 1999 (millions)	Ranking 1999	Ranking 1998	Ranking 1990	Country or Group of countries	Estimated 1999 (millions)	Ranking 1999	Ranking 1998	Ranking 1990	Country or Group of countries	Estimated 1999 (millions)	Rank number in 1999	Rank number in 1998	Rank number in 1990
United States	1 044 868	1	1	1	United States	30 607	1	1	1	United States	125 418	1	1	1
Japan	162 798	2	2	4	Japan	8 605	2	2	2	Japan	22 348	2	2	4
United Kingdom	160 362	3	3	3	Republic of Korea	8 195	3	3	7	United Kingdom	20 599	3	3	3
Germany	105 221	4	5	7	Germany	6 780	4	4	4	Germany	17 015	4	4	6
France	102 152	5	4	5	Singapore	5 554	5	7	9	France	14 246	5	5	5
China (2)	80 575	6	6	14	France	5 151	6	5	3	Republic of Korea	13 138	6	6	11
Hong Kong SAR	43 907	-	-	-	United Kingdom	5 078	7	6	5	Singapore	11 749	7	8	10
Australia	75 742	7	7	8	Netherlands	4 202	8	8	8	Netherlands	11 333	8	7	9
Netherlands	71 282	8	8	10	China (2)	3 381	9	9	16	China (2)	10 115	9	10	16
Canada	65 313	9	9	6	Hong Kong SAR	4 592	-	-	-	Hong Kong SAR	8 759	-	-	-
Singapore	64 765	10	10	9	Luxembourg	2 506	10	10	110	Australia	9 017	10	9	8
Republic of Korea	55 711	11	11	16	Canada	2 003	11	13	10	Canada	7 928	11	11	7
Russian Federation	45 863	12	13	-	Australia	1 893	12	11	11	Italy	5 582	12	13	13
Spain	44 217	13	14	12	Switzerland	1 840	13	12	14	Brazil	5 322	13	12	12
Brazil	41 866	14	12	11	Thailand	1 727	14	15	18	Thailand	5 184	14	16	17
Italy	40 143	15	15	13	Italy	1 639	15	16	12	Switzerland	5 123	15	15	15
Thailand	38 345	16	16	17	Brazil	1 532	16	14	13	Russian Federation	5 036	16	14	-
Malaysia	34 067	17	18	23	Malaysia	1 432	17	17	22	Spain	4 746	17	17	14
Switzerland	33 562	18	17	21	Gulf States (4)	1 360	18	19	30	Malaysia	4 465	18	18	23
Mexico	29 149	19	19	18	Chile	1 146	19	18	27	Gulf States (4)	3 785	19	19	30
Scandinavia (3)	26 165	20	20	15	Israel	1 042	20	20	15	Scandinavia (3)	3 214	20	20	18
India	25 268	21	21	19	Saudi Arabia	1 017	21	21	21	Mexico	2 866	21	24	22
Gulf States (4)	24 902	22	22	29	Russian Federation	908	22	25	-	India	2 853	22	21	19
New Zealand	20 896	23	23	24	New Zealand	856	23	22	28	New Zealand	2 833	23	22	25
Saudi Arabia	19 618	24	24	20	Spain	852	24	23	17	Saudi Arabia	2 783	24	23	20
South Africa	19 021	25	25	28	Scandinavia (3)	743	25	26	23	Luxembourg	2 573	25	25	99
Belgium	17 692	26	27	31	South Africa	700	26	28	33	South Africa	2 386	26	28	31
Indonesia	14 544	27	26	22	Colombia	644	27	24	25	Israel	2 259	27	26	24
Argentina	14 070	28	28	25	India	576	28	27	19	Belgium	2 128	28	29	26
Israel	13 515	29	30	32	Belgium	535	29	29	20	Chile	2 107	29	27	36
Turkey	13 350	30	29	37	Indonesia	378	30	30	24	Austria	1 630	30	33	43

1. Most 1999 data are estimates, thus the ranking and the rate of increase or decrease may change when final data become available.
2. 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 1999 and their ranking in 1998 and 1990 — 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 1999 (millions)	Rank number in 1999	1998	1990	Country or group of countries	Estimated 1999 (millions)	Ranking 1999	1998	1990	Country or group of countries	Estimated 1999 (millions)	Ranking 1999	1998	1990
United States	288 051	1	1	1	United States	17 570	1	1	1	United States	43 708	1	1	1
United Kingdom	153 144	2	2	2	Republic of Korea	8 057	2	2	6	United Kingdom	19 976	2	2	2
Germany	97 013	3	4	4	Japan	7 641	3	3	2	Germany	16 175	3	4	4
Japan	91 463	4	3	3	Germany	6 705	4	4	3	Japan	16 144	4	3	3
Netherlands	71 173	5	5	7	Singapore	5 554	5	6	8	Republic of Korea	12 425	5	5	8
France	67 956	6	6	5	United Kingdom	5 068	6	5	4	Singapore	11 749	6	8	7
Singapore	64 765	7	7	6	France	4 839	7	7	5	Netherlands	11 322	7	6	6
Republic of Korea	48 538	8	10	13	Netherlands	4 201	8	8	7	France	10 929	8	7	5
Australia	47 436	9	8	8	Luxembourg	2 506	9	9	107	Australia	6 130	9	9	9
Canada	43 728	10	9	9	China (3)	1 964	10	15	22	Canada	5 599	10	10	10
Thailand	35 057	11	11	10	Hong Kong SAR	4 592	-	-	-	Switzerland	5 095	11	11	12
Switzerland	33 279	12	12	14	Switzerland	1 838	11	10	12	Thailand	4 854	12	12	13
Italy	30 470	13	13	12	Thailand	1 694	12	13	15	Italy	4 632	13	13	11
Malaysia	29 253	14	16	19	Canada	1 632	13	12	11	Malaysia	4 014	14	16	21
Spain	29 059	15	14	15	Australia	1 626	14	11	9	China (3)	3 845	15	17	29
Gulf States (2)	24 765	16	17	24	Italy	1 624	15	14	10	Hong Kong SAR	8 759	-	-	-
Brazil	21 421	17	15	17	Malaysia	1 376	16	16	20	Gulf States (2)	3 775	16	15	26
China (3)	19 877	18	20	33	Gulf States (2)	1 359	17	17	29	Spain	3 362	17	18	14
Hong Kong SAR	43 907	-	-	-	Chile	1 095	18	19	25	Brazil	3 079	18	14	16
New Zealand	18 072	19	21	20	Brazil	1 054	19	18	14	New Zealand	2 606	19	19	23
Scandinavia (4)	17 910	20	19	16	Israel	1 042	20	20	13	Luxembourg	2 573	20	21	97
Belgium	17 692	21	22	26	Saudi Arabia	936	21	21	18	Scandinavia (4)	2 418	21	20	17
Russian Federation	16 862	22	18	-	New Zealand	839	22	22	28	Israel	2 233	22	22	19
South Africa	14 247	23	25	34	Spain	746	23	25	17	Saudi Arabia	2 138	23	24	18
Saudi Arabia	13 357	24	24	18	Scandinavia (4)	712	24	24	21	Belgium	2 128	24	25	22
Israel	13 225	25	26	28	South Africa	646	25	26	38	Russian Federation	2 088	25	23	-
Mexico	13 188	26	28	21	Russian Federation	571	26	27	-	South Africa	1 904	26	27	36
India	13 106	27	23	22	Colombia	563	27	23	23	Chile	1 766	27	26	35
Austria	12 702	28	27	38	Belgium	535	28	28	16	Austria	1 627	28	29	42
Ireland	10 953	29	35	35	India	408	29	29	19	India	1 624	29	28	20
Turkey	10 002	30	29	37	Austria	354	30	34	52	Mexico	1 400	30	30	28

1. Most 1999 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. 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.

4. Three States - Denmark, Norway and Sweden.

Source: ICAO Air Transport Reporting Form A-1.

Table 2-8. Estimated international non-scheduled revenue passenger traffic (1998 and 1999)

Category	1998 pass.-kms performed (millions)	1998 Percentage of total carriers	1998 Percentage of total traffic	1999 pass.-kms performed (millions)	1999 Percentage of total carriers	1999 Percentage of total traffic	Annual change (%) 1999/98
Scheduled carriers	108 000	45	-	124 000	47	-	14.8
Non-scheduled carriers	130 000	55	-	140 000	53	-	7.7
TOTAL NON-SCHEDULED TRAFFIC	238 000	100	13.6	264 000	100	14.1	10.9
TOTAL SCHEDULED TRAFFIC	1 512 100	-	86.4	1 614 600	-	85.9	6.8
TOTAL TRAFFIC	1 750 100	-	100.0	1 878 600	-	100.0	7.3

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

Table 2-9. Main aircraft types ordered and delivered (1999)

Aircraft	Orders	Deliveries	Backlog
Airbus A319/320/321	273	217	991
Boeing 737	213	296	847
Canadair RJ	166	73	355
Embraer EMB-145	102	79	163
De Havilland Canada DHC-8	57	25	76

Source: Aircraft manufacturers.

Table 2-10. Commercial transport fleet[1] at year end (1990, 1998, 1999[2])

	TURBOJET		TURBOPROP		PISTON ENGINE		
Year	Number	Percentage	Number	Percentage	Number	Percentage	Total aircraft all types
1990	9 407	76.9	2 291	18.7	540	4.4	12 238
1998	13 568	78.6	3 340	19.3	362	2.1	17 270
1999	14 406	79.1	3 443	18.9	355	2.0	18 204

1. Aircraft having a maximum take-off mass of less than 9 000 kg (20 000 lb) are not included.
2. Data for China and the Russian Federation are not included.

Source: Various sources.

Table 2-11. Consolidated balance sheet — Scheduled airlines of ICAO Contracting States[1] (End of fiscal years 1990, 1997 and 1998)

	1990		1997		1998	
	U.S.$ (million)	% of total	U.S.$ (million)	% of total	U.S.$ (million)	% of total
ASSETS						
Current assets	67 650	29	89 550	26	89 890	25
Fixed assets	131 860	56	204 180	58	215 510	60
Flight equipment	97 950	42	161 700	46	169 910	47
Ground property and equipment	23 730	10	28 230	8	31 070	9
Land	1 280	1	3 810	1	3 620	1
Investments in affiliated companies	8 900	4	10 440	3	10 910	3
Other assets	34 360	15	57 140	16	56 780	16
TOTAL ASSETS	233 870	100	350 870	100	362 180	100
LIABILITIES						
Current liabilities	74 670	32	99 750	28	107 340	30
Current liabilities	60 380	26	79 980	23	86 850	24
Unearned transportation revenues	14 290	6	19 770	6	20 490	6
Long/medium-term liabilities	118 540	51	175 790	50	173 630	48
Long-term debt	74 940	32	112 300	32	107 800	30
Other medium/long-term liabilities	43 600	19	63 490	18	65 830	18
Stockholders' equity	40 660	17	75 330	21	81 210	22
Share capital	17 880	8	26 200	7	26 980	7
Other capital	22 780	10	49 130	14	54 230	15
TOTAL LIABILITIES	233 870	100	350 870	100	362 180	100
ACCUMULATED DEPRECIATION						
Flight equipment	69 270	77	105 620	77	106 690	77
Ground property and equipment	20 860	23	32 120	23	31 530	23
TOTAL ACCUMULATED DEPRECIATION	90 130	100	137 740	100	138 220	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 1999 in the management and organization of airports and air navigation facilities and services, with regard to infrastructure, traffic and financing of airports; and focuses on basic financial and technical aspects of air navigation services.

MANAGEMENT AND ORGANIZATION

Airports

3.2 The year 1999 saw a continuation of trends towards autonomy in the provision of airports, and towards private participation in airport operations, management, and financing. The interest shown over the last years by some airports and private airport management companies in Europe and North America in various airport privatization projects around the world continued.

3.3 The new trend of airport cooperating strategies or alliances also continued. For example: the airports of Washington-Dulles (United States) and Chateauroux (France) signed an agreement to boost cooperation in cargo services between them; Amsterdam airport (Netherlands) took two initiatives, one with Frankfurt airport (Germany) to study possible areas of cooperation in privatization projects involving other airports around the world, the other with Brussels airport (Belgium) to join forces on information and communication technology.

3.4 The use of secondary airports located in the vicinity of large conurbations, as a means of by-passing congested airports, increased notably, especially in Europe. Traffic generated at these airports by low cost carriers has in many instances had the beneficial effect of leading to increased use of facilities that were under utilized before.

3.5 As to developments at the State level, in Canada, further implementation of government plans added Charlottetown (Prince Edward Island), Terrace (British Columbia), and Regina (Saskatchewan) airports to those previously transferred from the Federal Government to local autonomous authorities, while discussions were being finalized for such 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 due to be awarded for the management of Niagara Falls airport (New-York) to a Spanish firm, while a 30-year contract was awarded to the British group TBI plc for the management of the domestic terminal of Orlando-Sanford airport. Privatization plans were announced or underway in Europe in 1999 for some airports, including Copenhagen (Denmark); Paris (France); Frankfurt (Germany); the Aer Rianta Group (which manages Cork, Dublin and Shannon airports in Ireland); Rome (Italy); Amsterdam (Netherlands); the two Bucharest airports (Romania); the future airport of Ciudad Real (Spain); and Zurich (Switzerland). Two airport managing companies

became stockholders in other airport companies: Aéroports de Paris (France) took 25 per cent of Liège (Belgium), and in the United Kingdom, Manchester took 82.7 per cent of Humberside.

3.6 Latin America and the Caribbean were very active regions in 1999 with regard to privatization/commercialization of airports. In Chile a 15-year concession for the management of the passenger terminal of Santiago airport was awarded to an international consortium, which included Chilean, Spanish and Canadian (Vancouver airport) interests, together with a construction programme to upgrade other areas of the airport. In Costa Rica the Airport Group International (AGI), now purchased by the TBI group, together with two local construction firms and Bechtel of the United States, won a 20-year concession to operate San Jose/Juan Santamaria airport. In the Dominican Republic, a 20-year concession to manage a group of four airports, including Santo Domingo and Puerto Plata, was awarded to a consortium led by Ogden of the United States and comprising Vancouver airport, Italian and local interests. In Mexico a 15-year concession contract was awarded to an international consortium led by AENA (Spanish airports) of Spain to operate a group of nine airports on the Pacific seaboard of the State, including Guadalajara, Puerto Vallarta and Tijuana. In Uruguay, the final award of a 25-year concession to operate Montevideo airport to a consortium led by Vancouver airport was delayed pending clarification of the financial strength of one of the partners. In Venezuela, Barcelona airport will be managed by a public/private joint venture led by Vienna airport. Privatization and/or creation of autonomous service providers were also under way in Argentina for a group of seven airports in the Neuquen province that were not part of the first privatization package in 1997 which involved 33 airports; such developments were also underway in Belize (two airports); Guatemala (two airports); Guyana (Georgetown); Honduras (four airports); Jamaica (two airports); Mexico (for the remaining two groups of airports, one comprising Mexico City, and the other 13 airports in the North-Central part of the State, including notably Acapulco and Monterrey); and Peru (five airports).

3.7 In Africa, a management contract was awarded to the British BAA plc for Mauritius airport; and privatization/commercialization was considered in Namibia and Tunisia. In several States, autonomous civil aviation authorities were created (South Africa, Zimbabwe) or being considered (Botswana, Egypt, Namibia, United Republic of Tanzania). In Asia and the Pacific, plans are still underway for a number of privatization/corporatization projects: in Australia, where a public float of Sydney airport is being considered instead of a long-term lease as was done for the other Australian airports; in China, where an agreement has been signed between the China Airport Construction Co. (owned by the Civil Aviation Administration of China, CAAC) and a subsidiary of the British BAA plc for the creation of an Allied Airport Management Company, a joint venture which could operate up to six medium-sized airports yet to be identified; in Fiji, where the new Airports Fiji Ltd., created by the Government to manage 13 airports, is to be privatized, although some difficulties are being encountered with owners of airport land; in India, where long-term leases are now being offered for five international airports instead of outright corporatization; in Malaysia, where Malaysia Airports Berhad is to be floated on the Kuala Lumpur stock exchange; and in New Zealand, where Hamilton airport is to be sold to the private sector. Among the projects completed in this region in 1999, were: the establishment of a public/private company to manage the new Kochi (Cochin) airport in India; an agreement signed between Aéroports de Paris (France) and Angkasa Pura II to manage Jakarta-Sukarno Hatta airport (Indonesia); a joint venture established in Laos with Japanese interests to manage the terminal and ground handling activities at Vientiane airport; a 7.1 per cent holding in Auckland airport (New Zealand) purchased by Singapore airport; and the 25-year BOT ("Build, Operate, Transfer") contract

awarded in the Philippines to a consortium led by Frankfurt airport of Germany to operate the new international terminal at Manila-Ninoy Aquino airport.

Air navigation services

3.8 The trend towards providing air navigation services through autonomous entities continued in 1999; however private involvement has not been as actively pursued by Governments as it has in the case of airports. In the United States, while plans for air traffic services to be provided by a self-financing autonomous unit (separate from the FAA) are still considered, a number of calls have been made for a totally privatized air traffic control (ATC) system. Similar calls have been heard in Europe, where a privatized and unified ATC system is seen as being more capable of addressing congestion problems and reducing delays than the existing fragmented national systems. In the Czech Republic and Egypt plans are underway for autonomous ATC entities to be established, as was done in South Africa. In the United Kingdom, plans to sell the National Air Traffic Services (NATS) Ltd. to a public-private company are still under consideration, while an alternative plan, along the lines of the not-for-profit corporation established in Canada has been suggested by a House of Commons panel. In the South Pacific the joint management of airspace over a number of sovereign island States and territories and the high seas is under consideration.

MAJOR AIRPORT PROJECTS

3.9 At the end of 1999 there were 1 192 airports in the world open to international civil aviation. At the global level, projects completed, under construction or projected in 1999 that were aimed at providing more capacity at airports were reported in 98 States and were related to 256 airports. The majority of projects were concentrated in three regions. By far, the greatest number of such projects was reported in Europe, involving 124 airports in 33 States. Ranking second came Asia, where projects were reported for 37 airports in 20 States, in spite of a general slowdown in economic activity which delayed some of the projects. Projects in North America (including Mexico) concerned 34 airports in 3 States. Other regions of the world combined had projects involving 61 airports in 46 States and territories. The majority of projects aimed at increasing passenger capacity by expanding existing terminals (110 projects), or adding new terminals (104 projects) and at augmenting cargo handling capacity (78 projects). Also worth noting is the growing importance of projects related to rail links between airports and the cities they serve or connecting with the rail network at large (20 projects), thus emphasizing, mainly in Europe, the increased cooperation between formerly rival modes of transport.

3.10 During the year, five new major airports were completed: Haikou-Meilan and Shanghai-Pudong, both in China; Kochi, (formerly Cochin, India); Dammam-King Fahd (Saudi Arabia); Austin-Bergstrom, which involved the conversion of a former military air base (United States); while in other regions international airports, most of them destined to serve primarily tourist traffic, were completed at Gafsa (Tunisia), La Gomera, Canary Islands (Spain), Cochabamba (Bolivia), Nador (Morocco), and Nevsehir (Turkey). Work started or continued (planned completion dates shown in brackets) on major new airport projects at Guangzhou-Huadu (2005) (China); Athens-Spata (2001)

(Greece); Tehran-Imam Khomeini (2000) (Islamic Republic of Iran); Kobe (2005) and Nagoya-Chubu (2005) both in Japan; Seoul-Inchon (2001) (Republic of Korea); and Bangkok-Nong Ngu Hao (2005) (Thailand). Plans were also announced or continued to be studied for new international airports to serve the following cities: Guayaquil and Quito (Ecuador); Berlin-Brandenburg (Germany); Tokyo (Japan), where the "megafloat" concept (floating airport) may be utilized; Almaty-Kapchagai (Kazakhstan); Mexico City-Tizacuya (Mexico); Kathmandu (Nepal); Warsaw (Poland); Lisbon-Ota (Portugal); Madrid-Campo Real (Spain); Stockholm-Sodertorn (Sweden); Tunis (Tunisia), where the new airport at Enfidha would also serve the tourist area of Monastir; and Ho Chi Minh City-Long Thanh (Viet Nam). However, the concept of an offshore airport for Amsterdam (Netherlands) was abandoned, at least until 2025. With regard to secondary airports serving international traffic between regional centres, plans were also announced for new international airport developments in the following countries: Cayo Coco and Cayo Largo (Cuba); Aarhus (Denmark); Arroyo Barril (Dominican Republic); Giza-6 October City, Bahariya, and Farafra (Egypt); Nantes (France); Bangalore, Chennai, and Hyderabad (India); on the north of Mauritius; Islamabad and Sialkot (Pakistan); Laguindingan (Philippines); and Danang (Vietnam).

3.11 Major airport expansion projects were underway in all regions in 1999, although concentrated, as noted above, in Europe, Asia and North America. New terminals were completed during the year, notably at the airports of Paro (Bhutan), Beijing (China), Punta Cana (Dominican Republic), San Salvador (El Salvador), Dresden and Stuttgart (Germany), Rome-Fiumicino (Italy), Nagoya (Japan), Vientiane (Laos), Abuja (Nigeria), Vladivostok (Russian Federation), Lanzarote (Canary Islands, Spain), Istanbul (Turkey), and London Luton (United Kingdom). Significant terminal expansions were completed at more than twenty airports, notably at Sydney (Australia), Vancouver (Canada), Hong Kong (Special Administrative Region of China), Copenhagen (Denmark), Paris-Charles De Gaulle (France), Tokyo-Narita (Japan), Singapore (Singapore), Madrid (Spain), Dubai (United Arab Emirates), and Cleveland and Los Angeles (United States). New terminals or significant terminal expansion works were under construction at about seventy airports all around the world: notably at Algiers (Algeria), Sydney (Australia), Vienna (Austria), Brussels (Belgium), Sao Paulo-Guarulhos (Brazil), Phnom Penh (Cambodia), Edmonton, Montreal-Dorval and Toronto-Pearson (Canada), Santiago (Chile), Abidjan (Côte d'Ivoire), Helsinki (Finland), Mulhouse/Basel (France/Switzerland), Dusseldorf and Frankfurt (Germany), Budapest (Hungary), Tel Aviv (Israel), Nairobi (Kenya), Bucharest (Romania), Zurich (Switzerland), Birmingham (United Kingdom), Houston, Miami, Minneapolis, New York, Orlando, Philadelphia and San Francisco (United States), Caracas (Venezuela), and Hanoi (Viet Nam). In addition, a number of expanded or new terminal projects were planned of another hundred major airports around the world.

3.12 Runway capacity was added at Bogota (Colombia), Nice and Paris-Charles De Gaulle (France); Hong Kong (Special Administrative Region of China), and Rome-Fiumicino (Italy) in 1999, with additions under construction at Helsinki (Finland), Paris-Charles De Gaulle (France), Minneapolis and Orlando (United States). In addition a number of new runway projects have been announced, notably at Brisbane (Australia), Vienna (Austria), Santiago (Chile), Osaka-Kansai and Tokyo-Narita (Japan), Barcelona, Madrid and Malaga (Spain), Stockholm (Sweden), Bangkok (Thailand), Entebbe (Uganda), Kiev (Ukraine), Abu Dhabi (United Arab Emirates), Atlanta (United States), and Hanoi (Viet Nam).

AIRPORT TRAFFIC

3.13 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 1 045 million passengers in 1999 (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 114 000 passengers every twenty-four hours. These 25 airports also handled a combined total of just over 11 million aircraft movements in 1999, corresponding to an average per airport of one take-off or landing every 72 seconds.

3.14 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 18th by movements, and Hong Kong 23rd by passengers but 56th 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 (21), Philadelphia (19), Cincinnati (9), Charlotte (25) and Seattle (17), all in the United States.

3.15 Table 3-1 also includes 1990 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 1990-1999 period, while aircraft movements increased at some 2.9 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.

3.16 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 532 million passengers in 1999, or about 50 per cent of the world total of international scheduled and non-scheduled passengers.

3.17 Over the 1990-1999 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 5.0 per cent per annum. Over this period, the highest annual growth rates in terms of individual passengers were recorded for Brussels (12 per cent) and Amsterdam-Schiphol (10 per cent). Taipei achieved the highest annual growth rate in terms of international aircraft movements (about 10 per cent) followed by Amsterdam and Munich (8 per cent each).

AIRPORT FINANCES

3.18 The financial situation of international airports continued to improve. More and more airports worldwide recover their expenses through charges on air traffic and income from concessions, rentals and other non-aeronautical sources. However, a large number of the 1 178 airports open to international civil aviation still do not recover all their expenses, principally owing to low traffic volumes with inadequate financial control and accounting procedures as well as organizational structures being major contributing factor. The proportion of income from non-aeronautical sources

has continued to increase and is now the main source of income (more than 50 per cent) for many airports in Europe and North America and also for major airports in the Asia, Middle East and the Pacific regions. As in previous years, airports with high traffic volumes generally show higher shares of non-aeronautical revenues and the share tends to increase as traffic increases.

3.19 The stabilization of the share which landing and associated airport charges represent in total airline operating expenses, which started in 1996 was followed by a decline in 1998 (1999 data were not available at the time of writing). That share was 3.9 per cent in 1998, compared to 4.5 per cent in 1995, 4.3 percent in 1996 and 4.1 per cent in 1997.

AIR NAVIGATION FACILITIES AND SERVICES

3.20 The financial situation of air navigation services also continued to improve, particularly where air navigation services were operated by autonomous entities. The situation has improved in all regions and is primarily explained by the growing emphasis States at large are placing on recovering their air navigation services costs, the continued growth of air traffic, and the increase in the number of States levying approach and aerodrome control charges. In contrast to airports, charges on air traffic are the prevailing source of income for air navigation services providers, accounting in general for more than 95 per cent of the total income. However, many States are still not allowing for depreciation and/or amortization in establishing the cost basis for their air navigation services charges, and thereby building reserves for facility renewal and expansion. The share which route facility charges represent in total airline operating expenses has basically remained at about the same level since 1994-95, fluctuating between 2.6 and 2.8 per cent and being at 2.6 per cent in 1998 (1999 data were not available at the time of writing).

3.21 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

3.22 Implementation of communications, navigation, surveillance/air traffic management (CNS/ATM) systems continued at an increased pace in 1999. Communication via data link was being widely used for transmission of ATM-related information, for example, for the delivery of oceanic clearances, pre-departure clearances and weather information. Significant technical and operational experience had been gained through trials and implementation of interim CNS/ATM systems. Past performance of controller-pilot data link communications (CPDLC) and automatic dependent surveillance (ADS) systems in oceanic airspace had proven their suitability for application with the initial objective of replacing high frequency (HF) voice communications. Trials have also been initiated to determine their suitability for use in continental high density airspace with the initial objective of relieving congestion on very high frequency (VHF) voice communications.

3.23 Work continued in a number of States and international organizations, with industry input, on developing certifiable aeronautical telecommunications network (ATN) subsystems. In particular, the air traffic services message handling service (ATSMHS) has been implemented in Spain and Thailand (for domestic use) and was being actively developed for operational use in Asia, Europe, Japan and the United States. Work also continued in the development and assessment of digital technologies to improve VHF communication spectrum utilization.

3.24 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. This work includes development of SARPs for GPS second civil frequency (GPS L5) and for a new civil satellite navigation system rooted in Europe and known as Galileo.

3.25 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 systems (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.

3.26 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 centres in London and Washington and the three ICAO satellite broadcasts known as the satellite distribution system for information relating to air navigation (SADIS), and the international satellite communication systems (ISCS1 and ISCS2), serve air navigation systems in all ICAO regions.

Air traffic management

3.27 Preparation for the International Telecommunication Union (ITU) World Radiocommunication Conference (2000) (WRC-2000), where allocation of the radio frequency spectrum to radiocommunication services (including aeronautical services) are decided, continued as a concerted effort of the civil aviation community. The ICAO position on issues of critical concern to civil aviation to be discussed at WRC-2000 was approved by the ICAO Council and served as the basis for the development of regional and national aviation positions.

3.28 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 incrementally as part of systems upgrades, with a view to achieving early benefits as well as meeting long-term objectives. 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, CPDLC and ADS allowed for more efficient communications and surveillance in remote airspaces. Work continued toward expansion of the ATS route network across the eastern part of the Russian Federation.

3.29 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 toward a coordinated implementation of 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 as a logical progression of the work already done. The panel will have met four times by the end of 2000, making significant progress toward the development of a global ATM operational concept.

3.30 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. Planning was underway to revise the route structure for the South Atlantic to introduce additional area navigation (RNAV) routes based on RNP 10 and to implement a lateral separation of 50 NM.

3.31 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, namely Asia, the Caribbean and parts of the west and South Atlantic area were preparing for implementation of RVSM.

Aerodromes

3.32 The revised specifications on airport physical characteristics are available to States for planning their airport developments as needed to accommodate the future larger aeroplanes with wing spans from 65 m up to but not including 80 m. The impact of these very heavy aeroplanes on the airport pavements are being studied concurrently with two full-scale pavement testing projects in progress in two States. Since these aeroplanes are likely to have full-length upper decks, the adequacy of the quantities of extinguishing agents currently specified in Annex 14, Volume I, continue to be studied. The emergency evacuation times of future larger aeroplanes is another issue that needs further study. The work on developing new specifications on rescue and fire fighting in difficult environments has just been completed. Studies on further improving the safety of aircraft operations at airports by revising the related specifications on aerodrome rescue and fire fighting services response to an emergency call have also been just completed. Studies for identifying a suitable alternative to halons (halogenated hydrocarbons) as a complementary fire extinguishing agent are on-going.

3.33 Based on studies and trials undertaken in States, ICAO specifications on visual aids for navigation were updated to reflect current technology. Further studies are under way. To ensure operational safety at airports, specifications on frangibility were also revised.

3.34 While there is a growing trend towards privatisation of airports in many parts of the world, the obligations of States with regard to ensuring safety of civil aviation in their sovereign territory remain

unchanged. In this context, many States would need to have appropriate legislation and regulations in place to be able to carry out safety inspections for ensuring that the privatized airport continues to provide adequate and safe facilities and services. ICAO has embarked on a programme of developing suitable provisions to assist States in their endeavours.

Aeronautical information and charts services

3.35 The objective of an 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. The use of Area Navigation (RNAV) in the Required Navigation Performance (RNP) environment depends on timely and high quality aeronautical information/data. Corrupt or erroneous aeronautical information/data can potentially affect the safety of air navigation. For this reason, in 1997 new requirements for 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 would satisfy all the functional stages required in the origin and maintenance aeronautical information/data.

3.36 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 placing an increasing need for the provision of aeronautical information/data to users in electronic format. For the above reasons, many States have already established or are in the process of planning to establish aeronautical databases in their AIS to meet the needs for storing, accessing, transferring and archiving of aeronautical information/data.

3.37 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 among different computer systems. To meet these requirements, ICAO commenced the development of recommendations for a future standardized aeronautical information conceptual model.

3.38 To satisfy the requirements for the provision of quality aeronautical information to users, new specifications for Annex 4 – *Aeronautical Charts* dealing with the provision of electronic terrain data and electronic aeronautical charts for cockpit display are under development by ICAO. Bearing in mind that one quality system comprises procedures, processes and resources, due account is given to the development of new ICAO training guidelines for AIS/MAP personnel based on the task analysis of AIS/MAP functions. Finally, new provisions for an AIS/MAP licence for inclusion in Annex 1 – Personnel Licensing are also under development.

Aeronautical meteorology

3.39 Considerable progress was achieved in the computer preparation of global forecasts of significant weather (SIGWX) by the two world area forecast centres in London and Washington. As a result, SIGWX charts for Europe, Middle East, the North Atlantic, Africa 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 140 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 so far permitted the closure of 5 of the original 15 regional area forecast centres (RAFCs).

3.40 The privatization, to varying degrees, of an increasing number of meteorological services prompted requests from States for clarification of the role of the designated meteorological authority in terms of Annex 3 — *Meteorological Service for International Air Navigation*.

3.41 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 in addition to the existing alphanumeric advisory messages.

Search and rescue

3.42 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.

3.43 The system also continued to expand its capability. There were 7 low-altitude and 3 geostationary satellites in operation and several replacement satellites incorporating technical enhancements were being built. At year's end, 35 local user terminals (LUTs) and 20 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 over-all response time. A geostationary component of the system has been developed which will provide for almost instantaneous alert.

3.44 Since it began trial operations in September 1982, the COSPAS-SARSAT system has contributed to the rescue of over 10 000 persons in aeronautical, maritime and terrestrial incidents.

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

Controlled flight into terrain (CFIT)

3.45 ICAO's Air Navigation Commission made its final review of a proposal to amend Annex 4 to depict terrain on ICAO Instrument Approach, Area, Standard Departure and Standard Arrival Charts. The proposal relates to terrain presentation on charts with the intent of improving the situational awareness of crews on the underlying terrain when flying arrivals, instrument approaches and departure procedures.

3.46 The ICAO Council adopted amendments to Annex 6, Parts I, II and III which implement many of the recommendations of the ICAO and Industry CFIT Task Force. These amendments included: expanded requirements for the ground proximity warning system (GPWS); a predictive terrain hazard warning function in the GPWS; and criteria for the conduct of instrument approach operations. Amendments to PANS-OPS, Volumes I and II have introduced criteria for non-precision instrument procedures with basic global navigation satellite system (GNSS) receivers and other area navigation (RNAV) systems. Further material to support RNAV procedures has been developed by the Obstacle Clearance Panel (OCP) and approved for circulation to States by the Air Navigation Commission; this also includes proposals on temperature corrections. The OCP is developing criteria for satellite-based augmentation system (SBAS) and ground-based augmentation system (GBAS) precision approach Category I procedures. Other criteria are being developed to support SBAS RNAV non-precision operations and SBAS RNAV operations with vertical guidance, where the vertical guidance does not meet the accuracy required for Category I operations. Development is also in hand of material to be included in PANS-OPS Volume I on standard operating procedures, checklists, departure and approach briefings and the stabilized approach.

3.47 The *CFIT Education and Training Aid*, developed by the ICAO and Industry CFIT Task Force, was distributed by ICAO in December 1998. This aid has also been widely distributed by the United States, Federal Aviation Administration (FAA), the Flight Safety Foundation, airframe manufacturers and industry organizations. ICAO is in the process of preparing language versions of the two training video presentations associated with the aid. ICAO is currently involved, with the CFIT and Approach and Landing Accident Reduction (ALAR) Action Group, in developing a combined CFIT/ALAR Training Aid intended to be more simple and more effective than the original training aid. ICAO is also cooperating with the FAA's Commercial Aviation Safety Team (CAST) and the CFIT Joint Safety Intervention Team (JSIT) initiative, as well as the European Joint Aviation Authority (JAA) JAA Safety Strategy Initiative (JSSI).

Flight safety and human factors

3.48 The Fourth Global Flight Safety and Human Factors Symposium was held in Santiago, Chile, from 12 to 15 April 1999. The Symposium was attended by more than 500 participants from 58 Contracting States and 6 international organizations. The recommendations of the Symposium provided ICAO one of the basis to formulate a follow-up, five-year plan of action on Flight Safety and Human Factors for the period 2000 to 2004, approved by the Air Navigation Commission in November 1999.

Table 3-1. Scheduled and non-scheduled traffic at world's major airports
(top 25 airports ranked by TOTAL passengers, 1999)

Rank No.	Airport (ranking by total commercial aircraft movements given in brackets)	Passengers embarked and disembarked				Aircraft movements			
		1999 (thousands)	1998 (thousands)	Change 1999/98 (%)	Average change per annum 1999/90 (%)	1999 (thousands)	1998 (thousands)	Change 1999/98 (%)	Average change per annum 1999/90 (%)
1	Atlanta (1)	77 940	73 127	6.6	5.5	882.0	821.0	7.4	1.6
2	Chicago (2)	72 568	72 485	0.1	2.1	849.0	851.0	-0.2	0.9
3	Los Angeles (4)	63 877	59 293	7.7	3.8	743.0	744.0	-0.1	2.0
4	London-Heathrow (11)	62 264	60 360	3.2	4.3	449.0	442.0	1.5	2.2
5	Dallas/Ft.Worth (3)	60 000	60 155	-0.3	2.4	821.0	825.0	-0.5	1.6
6	Tokyo-Haneda (46)	54 338	51 241	6.0	3.4	234.0	229.0	2.4	9.7
7	Frankfurt (18)	45 858	42 078	9.0	5.3	428.0	406.0	5.5	3.7
8	Paris-Charles de Gaulle (7)	43 597	38 465	13.3	7.6	467.0	422.0	10.7	8.0
9	San Francisco (22)	40 387	39 292	2.8	3.0	410.0	404.0	1.5	0.3
10	Denver (8)	38 034	36 831	3.3	3.7	466.0	443.0	5.2	0.5
11	Amsterdam (24)	36 781	33 952	8.3	10.6	394.0	377.0	4.4	8.3
12	Minneapolis (20)	34 216	30 348	12.7	5.9	424.0	401.0	5.7	3.1
13	Detroit (6)	34 038	31 544	7.9	4.7	467.0	453.0	3.2	3.8
14	Miami (12)	33 899	33 935	-0.1	3.1	441.0	458.0	-3.7	3.1
15	New York-Newark (14)	33 814	32 512	4.0	4.8	437.0	434.0	0.6	2.3
16	Las Vegas (26)	33 669	30 227	11.4	6.8	389.0	337.4	15.2	3.5
17	Phoenix (10)	33 533	31 769	5.6	4.9	452.0	433.0	4.3	2.1
18	Seoul (49)	33 371	29 296	13.9	7.9	214.0	210.0	1.8	7.3
19	Houston (16)	33 089	30 996	6.8	7.3	436.0	421.0	3.5	5.4
20	New York-Kennedy (31)	32 003	31 436	1.8	0.8	345.0	347.0	-0.6	2.3
21	London-Gatwick (44)	30 559	29 033	5.3	4.2	247.0	242.5	1.7	3.0
22	St Louis (5)	30 189	28 701	5.2	4.6	469.0	471.0	-0.4	2.0
23	Hong Kong (56)	29 733	27 209	9.3	5.3	171.0	163.4	4.7	6.8
24	Orlando (34)	29 173	27 749	5.1	5.3	323.0	323.4	-0.2	6.3
25	Toronto (28)	27 771	26 745	3.8	4.3	371.0	367.8	1.0	1.7
	T 0 T A L	1 044 701	988 779	5.7	4.5	11328.3	11 026.5	2.7	2.9

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, 1999)

Rank No.	Airport (ranking by international commercial aircraft movements given in brackets)	International passengers embarked and disembarked: 1999 (thousands)	1998 (thousands)	Change 1999/98 (%)	Average change per annum 1999/90 (%)	International aircraft movements: 1999 [2] (thousands)	1998 (thousands)	Change 1999/98 (%)	Average change per annum 1999/90 (%)
1	London-Heathrow (3)	54 826	53 178	3.1	5.0	379	373	1.5	3.4
2	Paris-Charles de Gaulle (1)	38 877	33 802	15.0	7.2	400	361	10.7	7.5
3	Frankfurt (4)	37 197	34 209	8.7	6.1	328	311	5.5	4.4
4	Amsterdam-Schiphol (2)	36 271	33 762	7.4	10.5	380	364	4.4	8.1
5	Hong Kong (11)	29 090	27 209	6.9	5.0	171	163	4.7	5.5
6	London-Gatwick (8)	27 628	26 301	5.0	3.9	202	199	1.7	2.6
7	Singapore (13)	24 490	22 523	8.7	6.1	163	165	-1.5	5.8
8	Tokyo-Narita (17)	22 503	21 670	3.8	2.3	125	119	5.1	1.3
9	Brussels (5)	19 981	18 393	8.6	12.2	289	277	4.3	6.4
10	Zurich (6)	19 410	17 678	9.8	5.9	242	228	6.4	5.2
11	Bangkok (20)	18 856	16 956	11.2	6.3	117	114	1.9	4.2
12	New York-Kennedy (22)	17 856	17 750	0.6	-0.2	96	97[1]	-0.6	-1.3
13	Miami (12)	15 757	15 486	1.7	5.1	164	170[1]	-3.7	3.2
14	Seoul (31)	15 474	13 007	19.0	6.9	83	82	1.8	6.3
15	Toronto (9)	15 422	14 805	4.2	4.6	182	180[1]	1.0	3.6
16	Copenhagen (7)	15 208	14 303	6.3	5.7	239	225	6.3	5.2
17	Los Angeles (33)	15 035	15 089	-0.4	4.6	78	78[1]	-0.1	1.3
18	Taipei (21)	15 015	13 826	8.6	5.9	107	107	-0.1	9.6
19	Manchester (19)	14 826	14 572	1.7	6.9	118	115	2.9	4.3
20	Palma de Mallorca (30)	14 679	13 402	9.5	7.0	93	86	8.2	6.8
21	Madrid (14)	13 537	12 166	11.3	7.1	146	128	13.9	7.7
22	Munich (10)	13 479	11 929	13.0	7.9	175	163	7.4	8.1
23	Rome-Fiumicino (16)	12 150	13 226	-8.1	4.2	132	131	0.9	5.2
24	Dusseldorf (18)	12 095	11 719	3.2	3.8	123	119	3.4	3.6
25	Dublin (15)	12 046	10 978	9.7	10.2	141	134	5.1	5.6
	TOTAL	531 708	497 939	6.8	5.8	4 673	4 490	4.1	5.0

1. Estimated values in this column.
2. 1999 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

Chapter 4
User and Public Interest

4.1 This chapter reviews the levels of safety and security in air transport in 1999, 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 and aviation medicine.

SAFETY

Scheduled operations

4.2 Preliminary information on aircraft accidents involving passenger fatalities in scheduled air services worldwide shows that in 1999 there were 20 aircraft accidents with passenger fatalities involving aircraft with a certificated maximum take-off mass of more than 2 250 kg. The number of passenger fatalities involved was 489. This compares with 20 fatal accidents and 904 passenger fatalities in 1998 (Table A1-3 in Appendix 1). Relating passenger fatalities to the volume of traffic, the number of passenger fatalities per 100 million passenger-kilometres decreased to 0.02 from 0.035 in 1998. However there was little change in the number of fatal aircraft accidents per 100 million aircraft-kilometres flown and the number of fatal aircraft accidents per 100 000 landings which remained at the 1998 rate levels of 0.09 and 0.10 respectively (Figures 4-1 to 4-3).

4.3 The safety levels are significantly different for the various types of aircraft operated on scheduled passenger services. For instance, in turbo-jet aircraft operations, which account for about 95 per cent of the total volume of scheduled traffic in terms of passenger-kilometres performed, there were 8 accidents in 1999 with 347 passenger fatalities; in turboprop and piston-engined aircraft operations, which account for about 5 per cent of the scheduled traffic volume, there were 12 accidents with 142 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 1999 there were 22 fatal accidents involving aircraft with a certificated maximum take-off mass of more than 2 250 kg with passenger fatalities (including 6 involving aircraft operating all-cargo services with passengers on board) with 129 passenger fatalities compared to 20 fatal accidents (including a mid-air collision counted as one accident) with 191 passenger fatalities in 1998.

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 8 fatal accidents (of which 5 involving aircraft operating all-cargo services with passengers on board) with 53 passenger fatalities in 1999.

Safety oversight

4.6 The ICAO universal safety oversight audit programme (USOAP) came into being on 1 January 1999. The USOAP 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 safety auditing of all Contracting States by the end of the year 2001.

4.7 The Safety Oversight Audit Unit (SOAU), established within the Air Navigation Bureau of ICAO on 1 January 1999, began auditing of Contracting States as of 1 March 1999 and was able to complete 49 audits by the end of 1999. In addition, three auditors' training courses and two seminars/workshops were conducted in two of the ICAO Regions and a number of documents designed to facilitate the audit process and assist States in their safety oversight activities were also developed.

4.8 A memorandum of understanding on safety oversight issues was signed between ICAO and the European Civil Aviation Conference (ECAC) in May 1999. The memorandum of understanding enables ICAO to have access to the ECAC safety data bank and allows for the secondment of appropriately qualified and experienced auditors to the SOAU for auditing assignments under the policies and principles established by ICAO.

SECURITY

4.9 During the reporting period, six acts of unlawful interference were officially reported or confirmed by concerned States. These included three unlawful seizures involving international flights and three seizures of domestic aircraft. Developments in acts of unlawful interference since 1980 are shown in Figures 4-4 to 4-6 and in Appendix 1, Table A1-4.

4.10 The ICAO Council continued its efforts to enhance the level of implementation of the ICAO security programme through a "Mechanism for financial, technical and material assistance to States with regard to aviation security". As inadequate training policy and practices have been identified as an impediment to consistent and uniform implementation of Standards and Recommended Practices (SARPs) contained in Annex 17, Security – Safeguarding International Civil Aviation Against Acts of Unlawful Interference, ICAO completed development of a number of Aviation Security Training Packages (ASTPs).

4.11 In order to assist Contracting States to comply with Aviation Security (AVSEC) SARPs, ICAO will cooperate with States, organizations and private entities seeking to promote international mutual assistance in the field of AVSEC, in particular within regions. Such cooperation will take the form of

a Regional AVSEC Partnership for the purpose of executing activities conducive to the development and implementation of an efficient regional approach to assistance to States, training activities and development of regional guidance material.

4.12 The Partnership will aim at pulling together all private and public entities interested in achieving significant improvements in aviation security in States and the region. All Parties will promote aviation security in the region, in particular by developing AVSEC regional expertise and utilizing it to satisfy the regional needs, ultimately complying with Annex 17 provisions. With regard to the financial aspect of the Partnership, the Parties under specific agreements will contribute in kind (experts, travel, equipment, technology) and/or financially.

Convention on the Marking of Plastic Explosives

4.13 Pursuant to the entry into force of the *Convention on the Marking of Plastic Explosives for the Purpose of Detection* on 21 June 1998, experts from 16 States being parties to the Convention were appointed to the International Explosives Technical Commission (IETC). The first session of the IETC was held at ICAO Headquarters from 13 to 15 December 1999. During the session, the Commission adopted its rules of Procedure, examined its mandate and work methodology, reviewed the status of the Technical Annex to the Convention, reviewed the tasks of the *Ad Hoc* Group of Specialists on the Detection of Explosives and identified its future work programme.

AIR CARRIER LIABILITY

Adoption of new international air law convention

4.14 The International Conference on Air Law (10 to 28 May 1999) adopted the *Convention for the Unification of Certain Rules for International Carriage by Air*, done at Montreal on 28 May 1999. This new legal instrument is known as the Montreal Convention of 1999.

4.15 The Convention introduces a number of modernized rules and is expected foremost to facilitate the recovery of damages without the need for lengthy litigation. It also permits the use of electronically-produced air travel documents, which will enhance the smooth flow of passengers, baggage and cargo.

FACILITATION

Cargo Facilitation

4.16 Chapter II of the Montreal Convention of 1999 contains provisions on documentation relating to passengers, baggage and cargo. Articles 6 and 16 of the Chapter, in particular, relate to the public law aspects of cargo facilitation which have implications for the on-going work by ICAO's Facilitation Panel on the cargo SARPs of Annex 9.

4.17 In January 1999, the Panel, at its second meeting, began its review of the SARPs with a view to making the provisions easier to understand and implement. Another reason for the review, which commenced with the cargo providers, stems from the contemporary customs and cargo management styles that are being introduced by governments and operators worldwide, putting greater emphasis on modern data processing technologies.

Machine readable travel documents

4.18 ICAO first published technical specifications for machine readable passports in 1980, as Doc 9303, *A Passport with Machine Reading Capability*. During the 1990s, Doc 9303 was expanded and was divided into separate parts to cover a family of machine readable travel documents, i.e. passports (Part 1), visas (Part 2), and other official travel documents including crew member certificates (Part 3). With the assistance of the Technical Advisory Group on Machine Readable Travel Documents (TAG/MRTD), ICAO has continued over the years to update the various parts.

4.19 The fourth edition of Part 1, *Machine Readable Passports*, was published in August 1999. The new edition introduces a bar code in the data page of a passport. States now have an optional, standard means of increasing the data capacity of the document for machine readable data storage. The revised specifications also describe a scheme for confirming the identity of the rightful holder of the passport with the assistance of reading machines. This involves the comparison of identifying details taken from the person presenting the passport (e.g. facial image, signature, fingerprint, or hand geometry) against equivalent details which have been recorded for the rightful holder of the passport.

4.20 The Eleventh Meeting of the TAG/MRTD was held in Montreal from 1-3 September 1999. It finalized and adopted technical specifications for wallet-size identification cards as described in Doc 9303, Part 3 (*Size 1 and Size 2 Machine Readable Official Travel Documents*). The specifications for these multi-functional machine readable cards will provide for the optional deployment of one or more machine readable technologies (bar codes, integrated circuit chip, magnetic stripe, optical memory, etc.) in addition to the mandatory optical character recognition (OCR) type font. These "advanced technology cards" specifications will be the basis for ICAO's promotion of applications related to popularly-called "smart cards" in modern passenger travel and facilitation.

ENVIRONMENTAL PROTECTION

4.21 In 1999, the aviation community continued to address the environmental problems associated with aircraft noise and with both the global and local impact of aircraft engine emissions.

Aircraft noise

4.22 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 accordance with the policy framework established by the ICAO Assembly in 1990.

4.23 States and airports are now considering what further steps may be needed. In April, the Council of the European Union adopted Council Regulation (EC) No. 925/1999 that would limit the use of former Chapter 2 aircraft which have been modified to meet Chapter 3 requirements. However, in adopting the Regulation, it decided to postpone the date of application by one year to 4 May 2000, referring to ongoing consultations with the United States and developments within ICAO. During the year, progress was made in ICAO on the development of a new noise standard more stringent than Chapter 3 and in June this work was expanded to include consideration of possible operating restrictions on Chapter 3 aircraft.

4.24 In addition, in February, ICAO increased the stringency of its noise standards for single-engine and light propeller-driven aeroplanes.

Aircraft engine emissions

4.25 In April, the Intergovernmental Panel on Climate Change (IPCC) completed a special report on *Aviation and the Global Atmosphere* which was prepared in collaboration with the Scientific Assessment Panel of the Montreal Protocol at ICAO's request. This report gives States, ICAO and other UN policy-making bodies an authoritative common base of information for addressing the global impact of aircraft engine emissions.

4.26 According to the IPCC special report, aircraft emit gases and particles which alter the atmospheric concentration of greenhouse gases, trigger the formation of condensation trails and may increase cirrus cloudiness, all of which contribute to climate change. Aircraft are estimated to contribute about 3.5 per cent of the total radiative forcing (a measure of change in climate) by all human activities. This percentage excludes the effects of possible changes in cirrus and it is projected to grow, primarily because of aviation's rapid rate of growth. Although improvements in aircraft and engine technology and in the efficiency of the air traffic system will bring environmental benefits, these will not fully offset the effects of the increased emissions resulting from the projected growth in aviation. Earlier concerns regarding aviation's possible role in depletion of the ozone layer are not borne out by this report, although this could become an issue if a significant fleet of supersonic civil aircraft were to be developed.

4.27 Policy-making regarding aircraft engine emissions 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.

4.28 In February, ICAO tightened the NO_x emission standards in Annex 16, Volume II, reducing the levels that aircraft engines will be allowed to emit by an average of 16 per cent (applicable to new engine designs after 2003). During the year, ICAO's work on emissions continued to address both global and local concerns, but with particular emphasis on developing policy options to limit or reduce greenhouse gas emissions from civil aviation. Some of the possibilities that are being explored include the further development of Annex 16 to specifically address emissions of global concern; the development of guidance material on operational measures to reduce emissions; and the potential role of market-based options, such as emissions-related levies (charges or taxes), emissions trading and voluntary agreements.

AVIATION MEDICINE

4.29 ICAO conducted civil aviation sessions at international congresses and meetings as well as lectures at symposia and seminars. These sessions permitted ICAO to brief doctors involved in aviation medicine, both at government level and as designated medical examiners, on recent developments at ICAO and to receive feedback which allows ICAO to coordinate its work programme with the real demands of the civil aviation world.

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 the 1 July 1996 deadline was still not achieved by the end of 1999 but considerable advance towards this goal had been made, both by legislation and by airline policies, and further progress was to be expected. As a measure of success of these efforts on certain markets, the United States Department of Transportation reported that by the December 1998 nearly 100 per cent of non-stop scheduled U.S. airline flights between that country and foreign points were smoke-free. In Scandinavia, a non-smoking policy was in force on all passenger flights by first quarter 1999. In Europe, several major airlines had prohibited smoking on board their flights worldwide by 1999; however, some airlines in Southern Europe still allow smoking. The three major airlines of Japan implemented bans on smoking on all passenger flights in 1999, whereas Aeroflot banned smoking on domestic and international flights of less than two hours. Widening airlines' alliances also contributed to achieving a smoke-free environment. In the case of Alitalia a smoking ban was extended on most flights within its route network in line with a policy enforced by its partner airlines KLM, Northwest and Continental. Among other carriers which introduced total smoking bans in 1999 were Air Seychelles and Iberia, while Lan Chile banned smoking on all international flights. Responding to other carriers' actions, Saudi Arabian Airlines

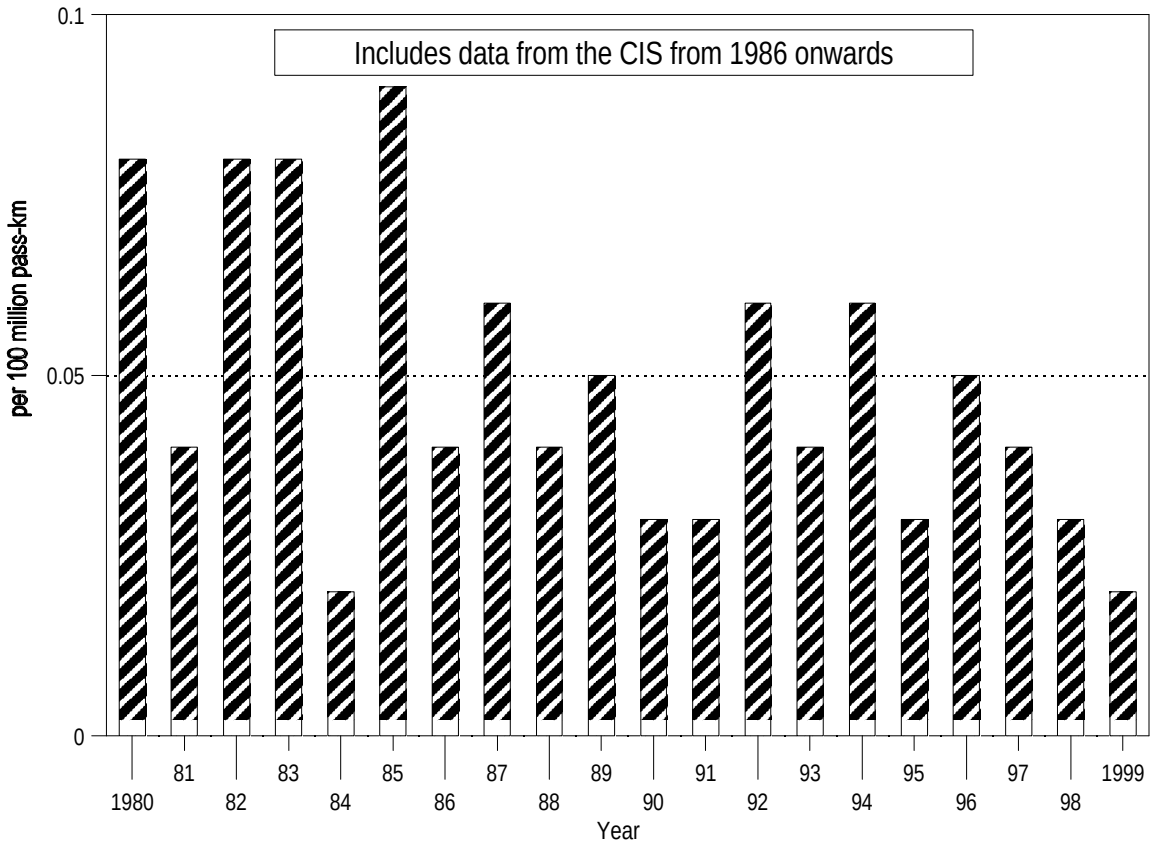
gradually banned smoking on its international services following a non-smoking policy on domestic flights.

Substance abuse

4.31 In February 1998, the ICAO Council adopted Amendment 162 to Annex 1 of the Chicago Convention 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 around alcoholism, drug abuse and other forms of problematic use of psychoactive substances.

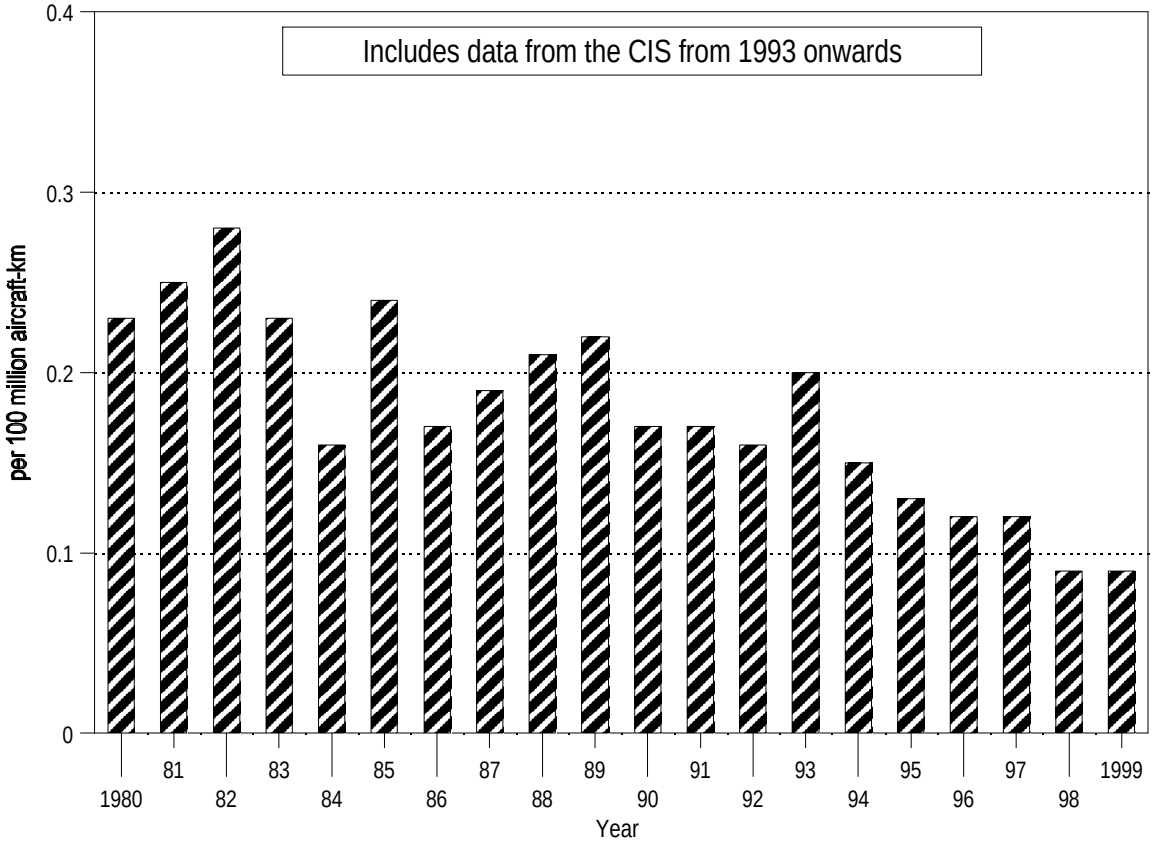
4.32 Considering the threat of substance abuse adequately addressed by the ICAO provisions and the Manual mentioned above, the Federal Aviation Administration of the United States withdrew, in January 2000, the proposed rulemaking from 1994, that would require foreign air carriers to establish drug and alcohol testing programmes for all employees performing safety-sensitive aviation functions.

Chapter 4 Graphs



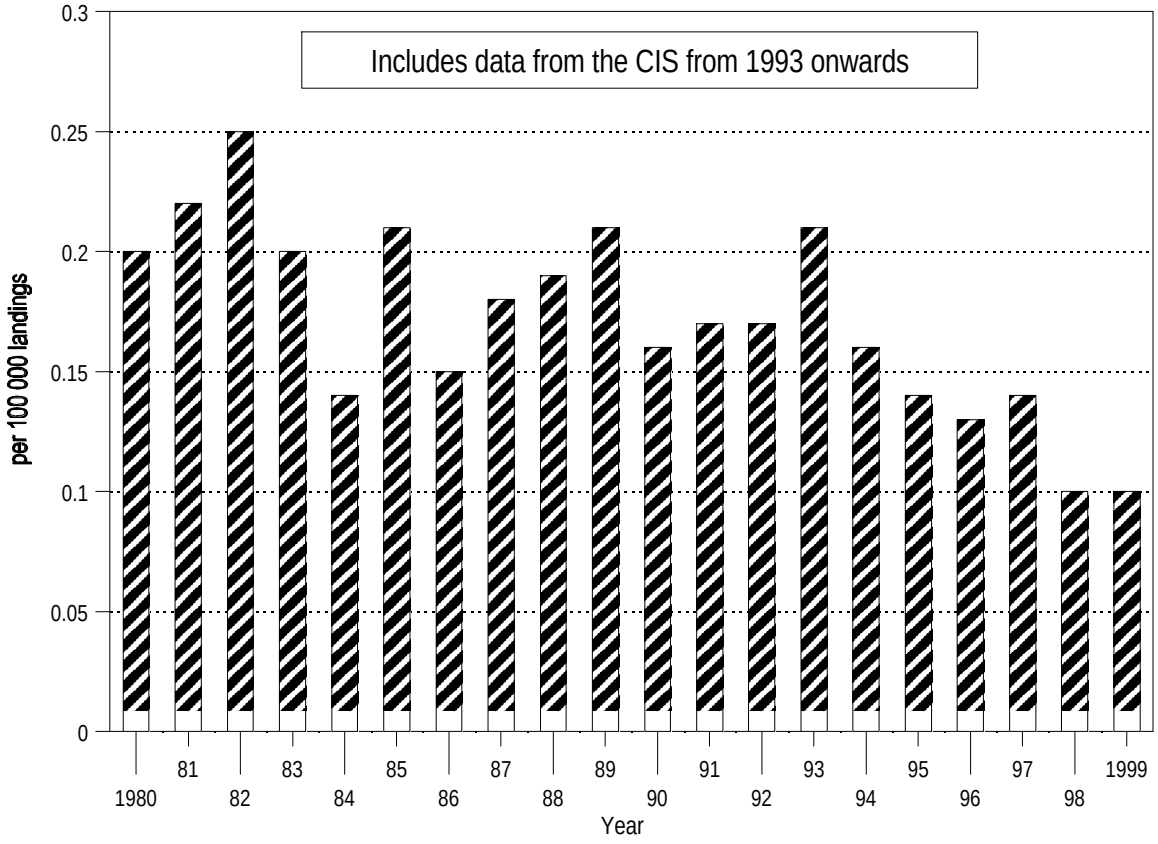
Source: ICAO Air Transport Reporting Form G and other reports.

Figure 4-1. Passenger fatalities per 100 million passenger-kilometres on scheduled services (1980-1999)



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

Figure 4-2. Fatal accidents per 100 million aircraft-kilometres flown on scheduled services (1980-1999)



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

Figure 4-3. Fatal accidents per 100 000 landings by aircraft on scheduled services (1980-1999)

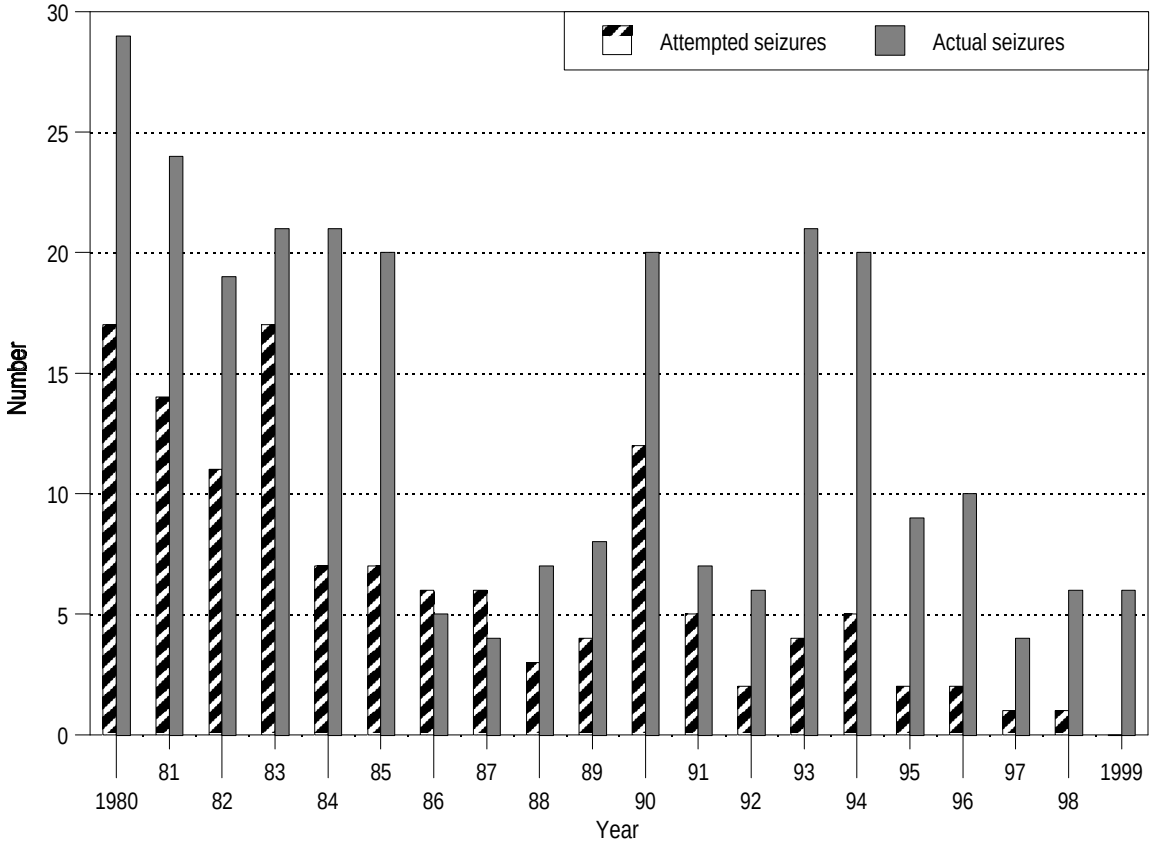


Figure 4-4. Acts of unlawful seizure (1980 to 1999)

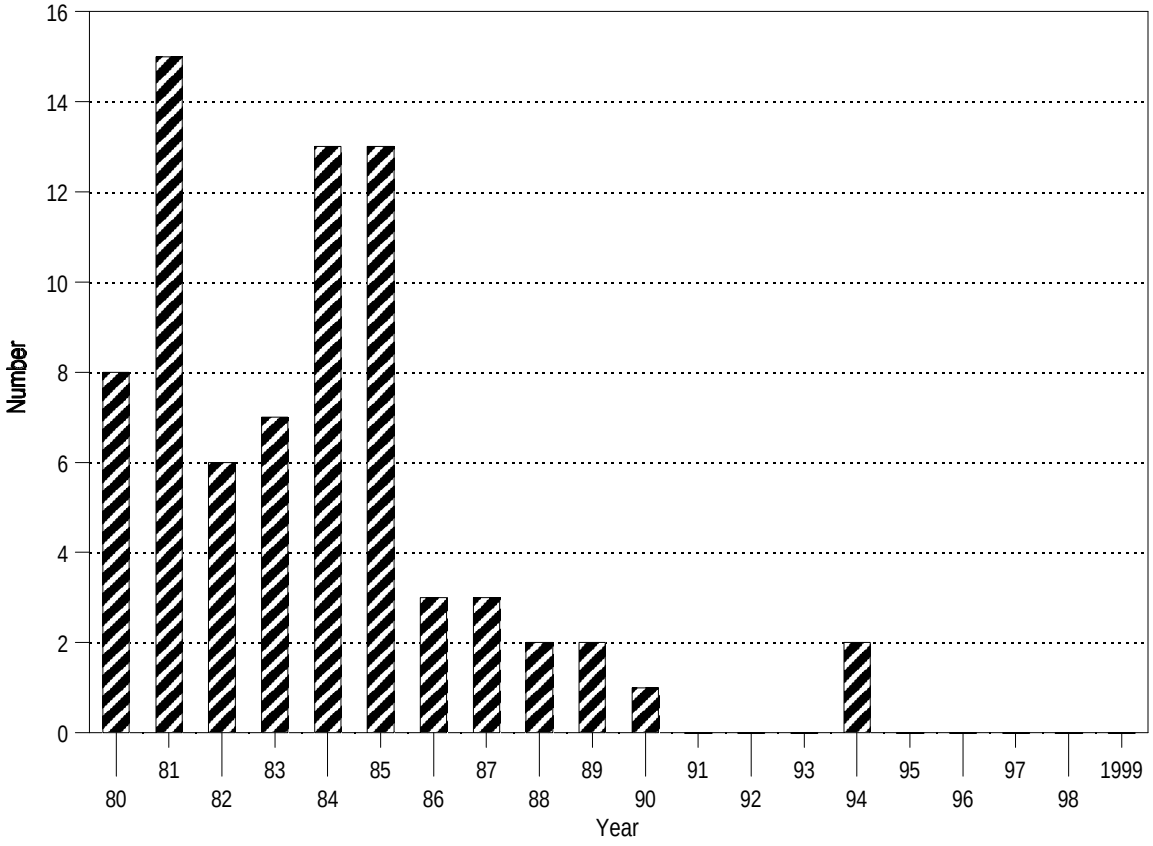


Figure 4-5. Incidents of sabotage (1980 to 1999)

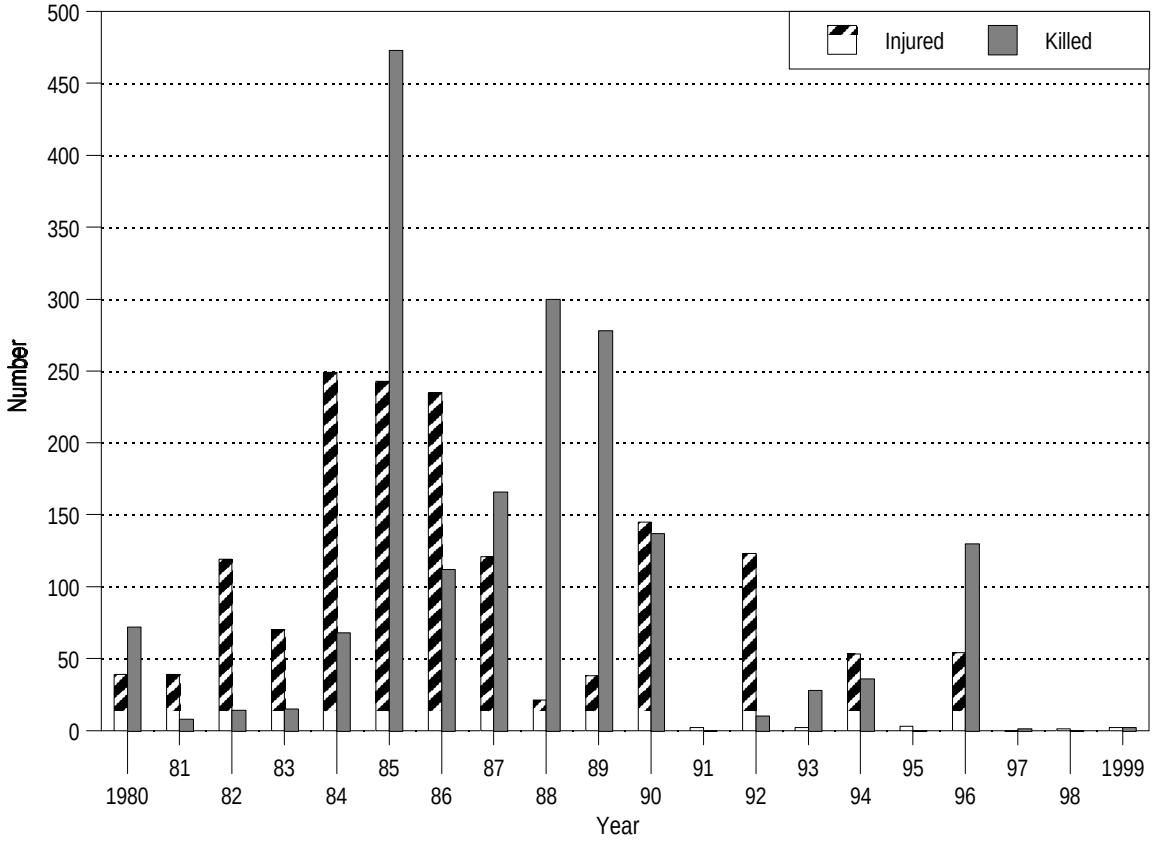


Figure 4-6. Number of persons killed or injured in acts of unlawful interference (1980 to 1999)

PART II

WORLD OUTLOOK TO 2002

Chapter 5
Global Trends and Forecasts

5.1 This chapter reviews historical developments in the world economy for the period 1988-1998 and anticipated developments through to 2002; 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 2002.

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 1988 and 1998, the aggregate world economy measured in terms of Gross Domestic Product (GDP) grew at an average annual rate of 2.3 per cent in real terms. Growth rates varied across regions, from a high of 4.2 per cent for Asia/Pacific to a low of zero for Europe including the "countries-in-transition" in Eastern Europe and the Commonwealth of Independent States (CIS) (see Chapter 6 for further details). World population growth between 1988 and 1998 increased at an average annual rate of 1.5 per cent. Hence growth of the world's GDP per capita between 1988 and 1998 increased at an average annual rate of 0.8 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 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. After a weak period and the 1998 recession year, the Japanese economy saw its GDP slowly recovering with a 0.3 per cent growth in 1999.

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 in 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 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 slowdown in the aggregate GDP growth of developing countries from 5.8 per cent in 1997 to 3.2 per cent in 1998 resulted primarily from contractions in output in several South-East Asian countries and a weakening performance in Latin America and the Caribbean. The 1999 economic performance of developing countries amounted to about 3.8 per cent GDP growth in real terms, which reflects a stabilization towards the end of the decade albeit at a lower level than throughout most of the 1990s.

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. This two-year downward trend was reversed during 1999 when the world trade price of crude oil in U.S. dollars more than doubled from about 10 dollars a barrel at the beginning of the year to almost 25 dollars a barrel towards the end, reaching a nine-year high.

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. During 1999 inflation in most industrial countries continued to either fall or stabilize at low levels resulting in an aggregate rate of 1.4 per cent. Inflation rates in developing countries as a group followed a similar overall trend of declining inflation rates and achieved in 1999 a historically low average rate of 6.7 per cent although immense variations prevailed from region to region and among countries of regional groupings.

5.8 After the 1998 slowdown, the world economy regained strength in 1999 with an estimated GDP growth of 3.0 per cent, mainly based on the economic recovery in the Asia/Pacific region and the continued strong growth in the USA economy. As the momentum of recovery has proven stronger than anticipated, the outlook predicts improved growth prospects, although rising crude oil prices may have a dampening impact. The projections for global and regional economic growth that have been used as a basis for air traffic forecasts over the period to 2002 are presented in Table 5-1. These regional and global assessments of the economic outlook take into account the most recent forecasts of the International Monetary Fund (IMF) and WEFA Group (formerly known as Wharton Econometrics Forecasting Associates), the World Bank, as well as the views of other organizations, in both governmental and private sector.

5.9 Backed by strong domestic demand, the United States' economy continued to expand at an above average rate during 1999 but is expected to slow down somewhat towards the latter part of the forecast period concerned. Europe is expected to grow at a marginally higher rate than experienced in the recent years.

5.10 The Asia/Pacific region regained some of its economic strength with approximately 3.5 per cent GDP growth and is expected to continue higher growth until the end of the forecast period. Latin America experienced the weakest performance of the 1990s but is expected to bounce back significantly over the next few years. Both the developing economies of the Middle East and the aggregate economy of the African region are expected to improve their economic performance with growth rates exceeding 4 per cent. Chapter 6 provides further details on the regional economic developments.

AIRLINE TRAFFIC TRENDS

5.11 Total scheduled airline traffic, measured in terms of total tonne-kilometres performed, grew at an average annual rate of 5.2 per cent between 1988 and 1999. Passenger-kilometres grew at an average rate of 4.6 per cent per annum and freight tonne-kilometres at 6.6 per cent per annum.

5.12 Global traffic data for each year of the decade 1988-1999 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 1988-1999 period was a reflection of economic conditions experienced over this period. As depicted in Figure 5-2, the relatively buoyant economic and air traffic performance during most of the 1980s came to an end in the middle of 1990. The economic recession in 1991 had a serious effect on air traffic. The recovery in traffic in 1992, which occurred despite continuing poor economic performance, was achieved at a cost of significantly reduced revenue yield. Although real yields declined further in 1993 and 1994, the stimulating effect on traffic demand was less dramatic than had been the case in 1992. On the other hand, economic growth began to provide a more solid foundation for traffic growth. These trends continued until 1997 but reversed in 1998 when GDP grew only at 1.9 per cent, providing for a growth of the total scheduled passenger traffic only of 2.1 per cent in that year. However, a strong economic performance resulted in 6.1 per cent traffic growth in 1999.

5.14 The regional distribution of scheduled passenger traffic for the years 1988 and 1999 is illustrated in Figure 5-3. The airlines of the North American and European regions dominate, contributing 72.4 per cent of the total traffic in 1988 and 66.2 per cent in 1999. Passenger traffic performed by airlines registered in the Asia/Pacific region increased from 18.1 per cent of the total world traffic in 1988 to about 23.9 per cent in 1999. Other regions contributed 9.5 per cent of the traffic in 1988 and 9.9 per cent in 1999.

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, 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 1988 has been about 3.8 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.

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 1988 in operating revenues and expenses, the operating result (earnings before interest, other non-operating items and taxes) and the net result (after interest, other non-operating items and taxes). The growth in revenues and expenses over the period reflects an expansion in activity levels and general inflationary pressures, offset by improvements in the efficiency of the industry. However, the impact of these factors has varied considerably over the business cycle. During the buoyant years of the 1980s, rapid growth in demand resulted in a more intensive use of airline resources and strong productivity growth. Airlines were able to improve their operating results and also offer relatively low fares and rates to their customers. In the early 1990s, market conditions changed as demand weakened and the utilization of airline resources tended to decline. The emergence of excess capacity and consequent competitive pressures put downward pressure on yields. These factors combined to produce negative operating results in three consecutive years (1990-1992). In 1993, the airline industry started to move towards a more appropriate balance of supply and demand and achieved a small operating surplus. A much better operating result was obtained in 1994 and by 1995 the industry delivered an operating surplus of $13.5 billion and obtained a positive net result of about $4.5 billion. In 1996, a reduced operating surplus of about $12.3 billion was achieved, 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. In 1998 the operating surplus reached $15.9 billion with a net result of $8.2 billion. According to preliminary estimates for 1999, an operating surplus of $12.5 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 6.6 per cent to 9.4 per cent, while there has been a comparable decline in the share of revenues from scheduled services. The counterpart of some of these changes on the expense side was an increase in the share of “Flight operations — Other”, which includes rental of aircraft from other companies. This suggests some restructuring within the airline industry. 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 1988-1999 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. The preliminary estimates for 1999 show the financial performance to be less buoyant compared with 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.

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 2000, 2001 and 2002 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 2000, 2001 and 2002, 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 5.9, 5.5 and 5.3 per cent for the years 2000, 2001 and 2002 respectively. These forecasts are illustrated in Figure 5-7, together with the annual growth pattern over the past 10 years.

5.27 Traffic growth will vary by geographic region because of the impact of specific local or regional factors. 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 perform slightly slower than the world average growth rate in 2000, and grow at a faster rate than the world average in both 2001 and 2002. The developing region of the Middle East is expected to experience moderate rate of passenger traffic growth for 2000 and slightly lower growth in 2001 and 2002, while Africa is expected to show higher growth rates for the years 2001 and 2002. 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

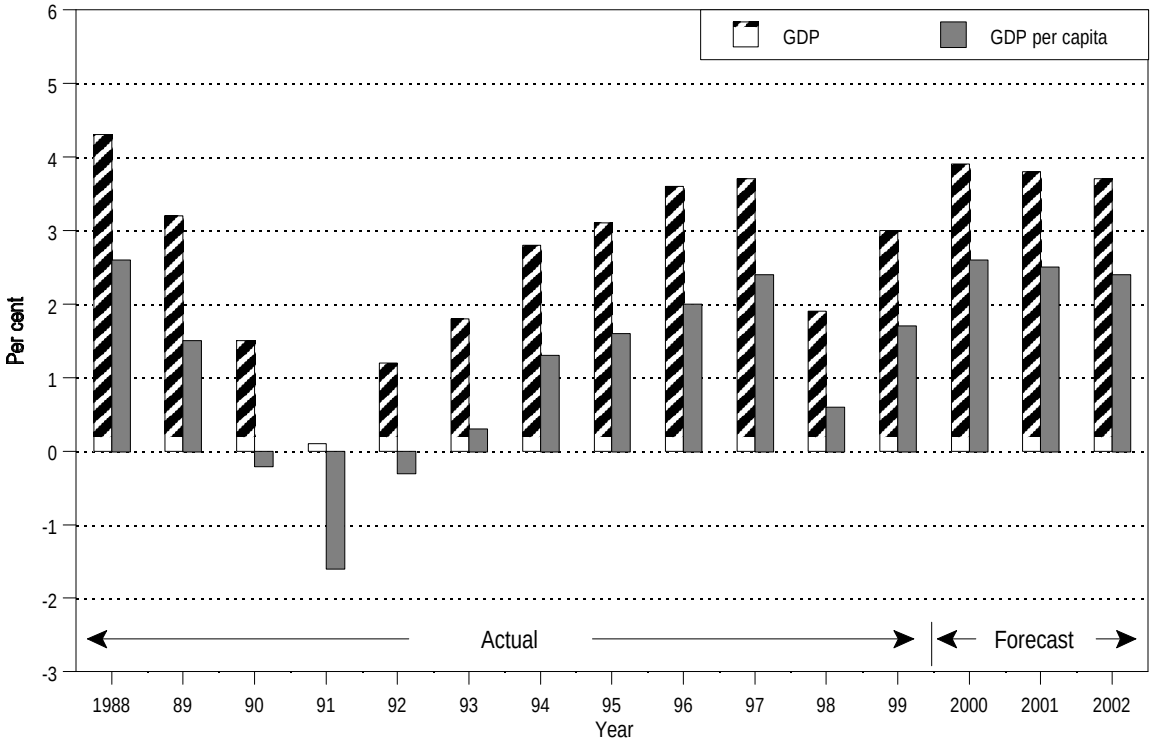
5.28 Financial trends in the airline industry are difficult to forecast because airlines are able to adjust capacity over time and manage yields through fare adjustments at relatively short notice to respond to (or to create) changes in demand. In addition, fluctuations in the value of the U.S. dollar 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).

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 3.9 per cent in 2000, 4.9 per cent in 2001 and 5.0 per cent in 2002. These compare with an average rate of 5.6 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 4.1 per cent in 2000, 4.8 per cent in 2001 and 4.9 per cent in 2002 (compared to an average rate of 5.6 per cent per annum over the past ten years).

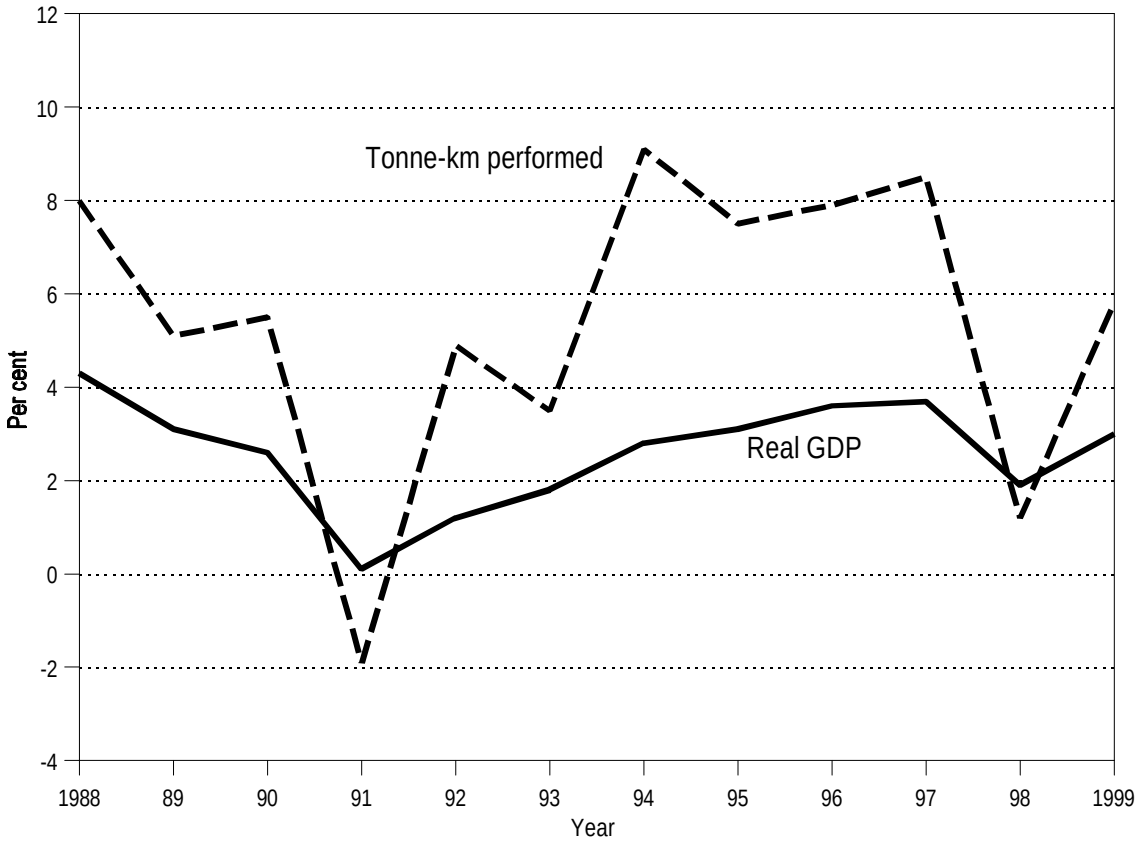
5.31 The operating result for the world's scheduled airlines is the difference between operating revenues and expenses, the forecasts of which have here been made independently and which are both subject to significant margins of error. It is therefore not possible to forecast the operating result with 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.

Chapter 5 Graphs



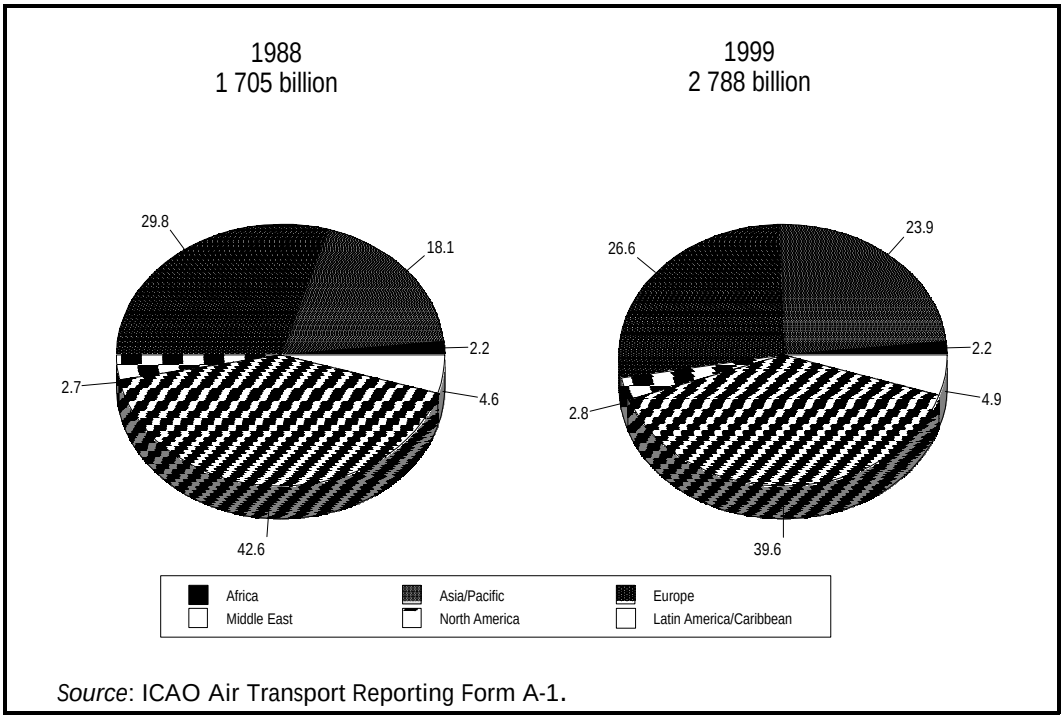
Source: IMF, WEFA Group.

Figure 5-1. Annual change in real GDP and GDP per capita — World (1988-2002)



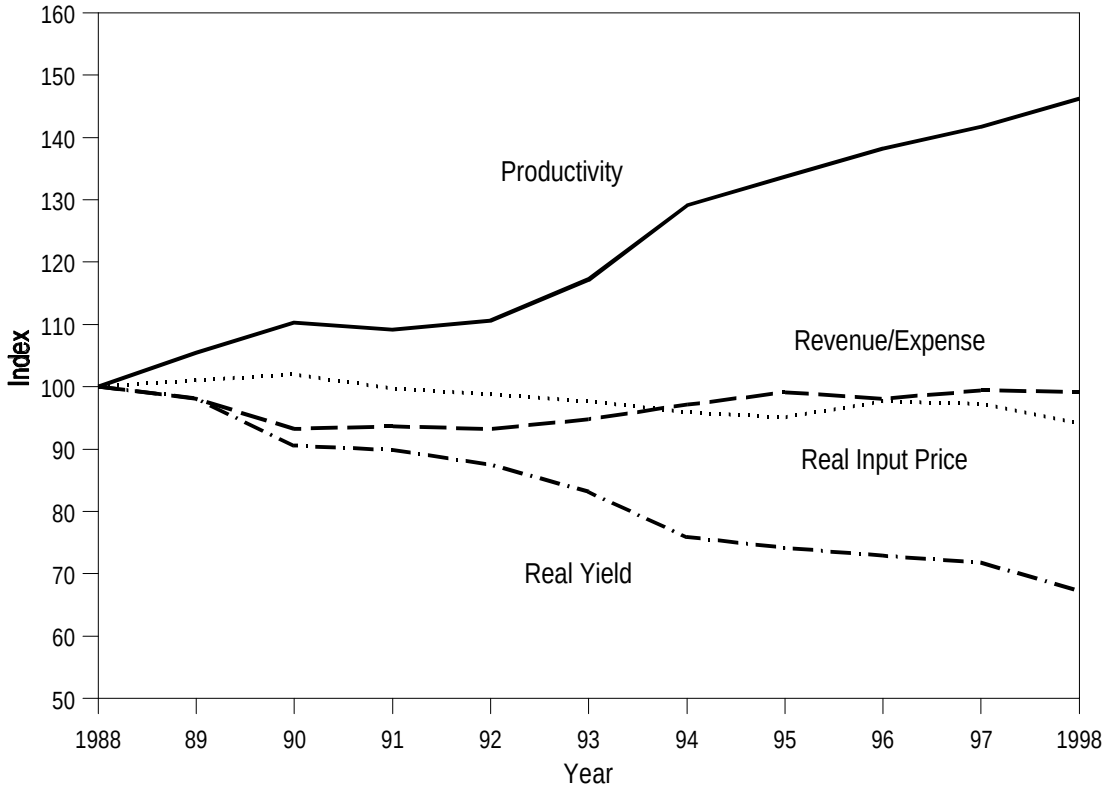
Source: IMF, ICAO Air Transport Reporting Form A-1.

Figure 5-2. GDP and scheduled traffic growth — World (1988-1999)



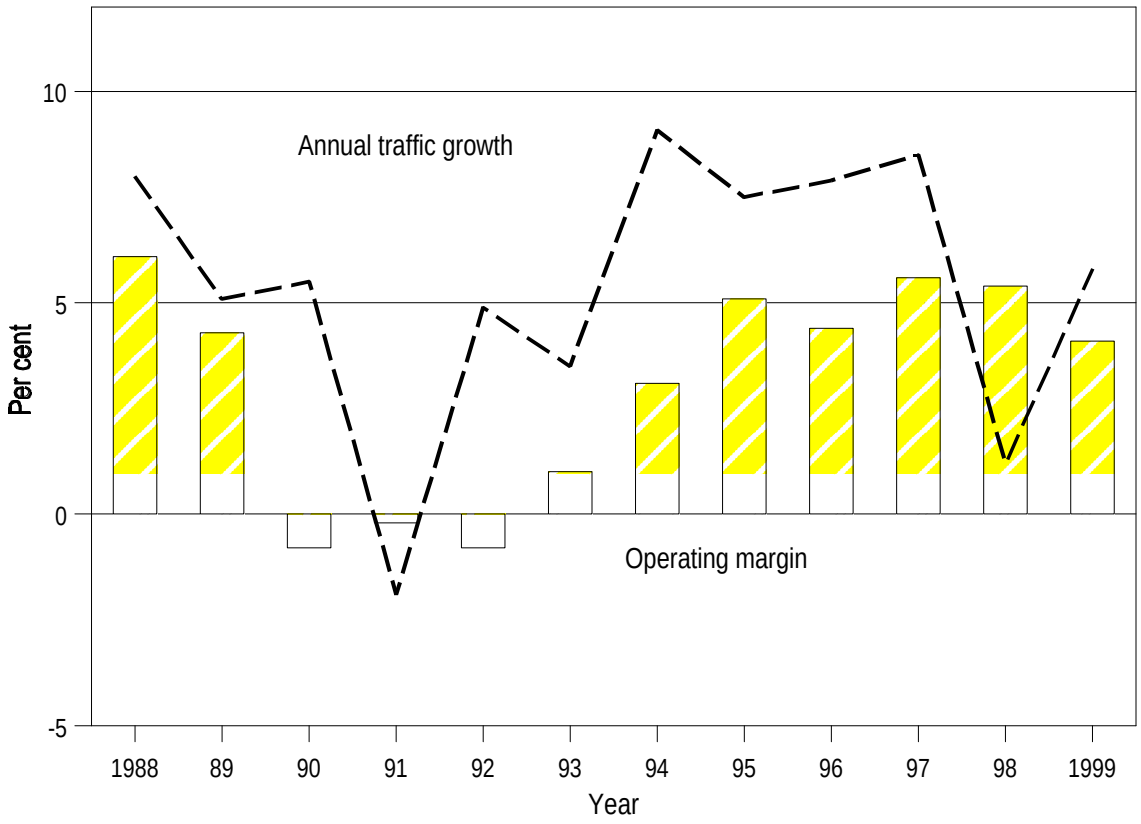
Source: ICAO Air Transport Reporting Form A-1.

Figure 5-3. Regional distribution of scheduled passenger traffic — percentage of passenger-kilomeres performed (1988 and 1999)



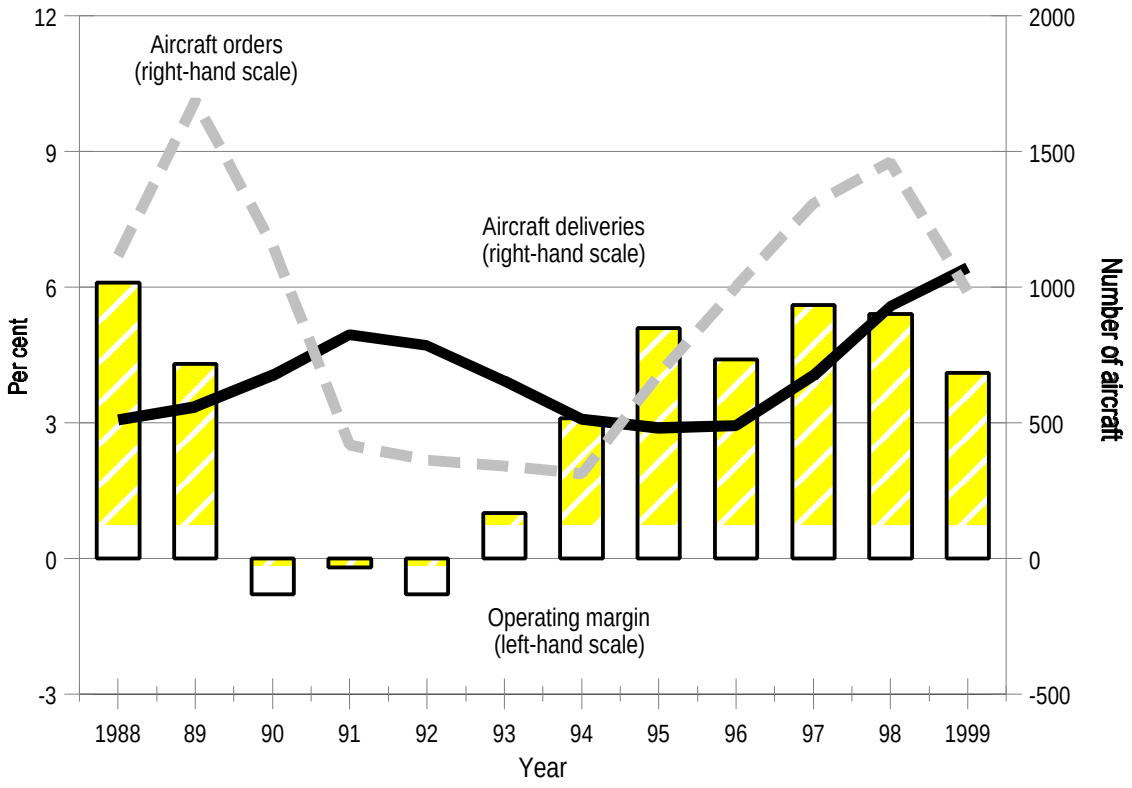
Source: IMF, ICAO Air Transport Reporting Form A-1 and EF-1.

Figure 5-4. Trends in performance of scheduled airline industry — World (1988-1998)



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

Figure 5-5. Financial return and traffic growth of scheduled airline industry — World (1988-1999)



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

Figure 5-6. Financial return and aircraft supply — World (1988-1999)

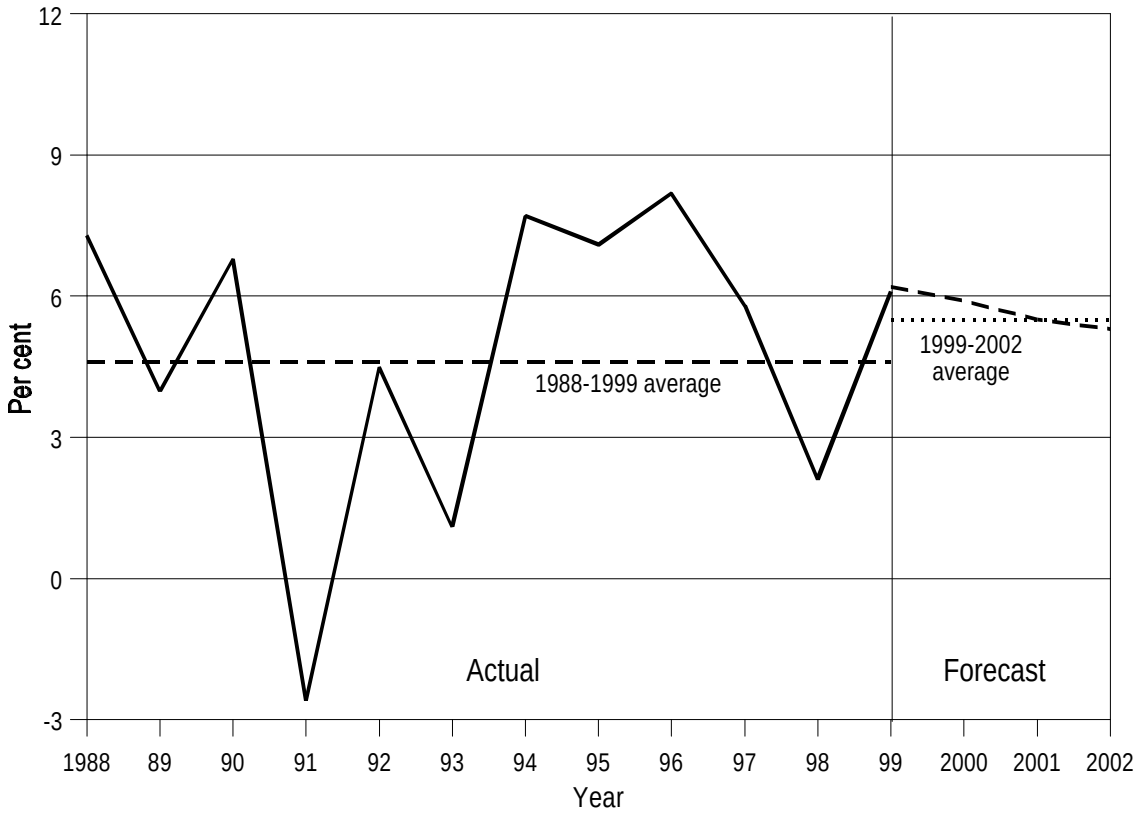


Figure 5-7. World scheduled passenger traffic growth — passenger-kilometres performed (1988-2002)

Tables for Chapter 5

Table 5-1. Economic growth (GDP) by region
(real average annual growth rates, per cent — 1998 to 2002)

Region	Actual 1998	Estimated 1999	Forecast 2000	Forecast 2001	Forecast 2002
Africa	3.1	2.7	4.4	4.7	4.3
Asia/Pacific	-0.3	3.5	3.9	4.4	4.3
Europe	2.5	2.3	3.2	2.9	2.8
Middle East	2.7	2.5	4.9	4.3	4.4
North America	4.2	4.2	4.5	3.5	3.4
Latin America and the Caribbean	2.1	0.2	4.0	4.5	4.7
World	1.9	3.0	3.9	3.8	3.7

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

Table 5-2. World total international and domestic revenue traffic
(scheduled services of airlines of ICAO Contracting States, 1988-1999)

	Passengers carried		Passenger-km		Freight tonnes carried		Freight tonne-km performed		Mail tonne-km performed		Total tonne-km performed	
Year	Millions	Annual increase (%)	Millions	Annual increase (%)	Millions	Annual increase (%)	Millions	Annual increase (%)	Millions	Annual increase (%)	Millions	Annual increase (%)
1988.0	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
1989.0	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
1990.0	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
1991.0	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
1992.0	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
1993.0	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
1994.0	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
1995.0	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
1996.0	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
1997.0	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
1998.0	1 471	1.0	2 626 910	2.1	26.5	0.4	101 770	-1.1	5 770	-3.7	348 470	1.2
1999.0	1 558	5.9	2 787 880	6.1	28.2	6.4	108 040	6.2	5 700	-1.2	368 800	5.8

Source: ICAO Air Transport Reporting Form A-1.

Table 5-3. World international revenue traffic

(scheduled services of airlines of ICAO Contracting States, 1988-1999)

	Passengers carried		Passenger-km		Freight tonnes carried		Freight tonne-km performed		Mail tonne-km performed		Total tonne-km performed	
Year	Millions	Annual increase (%)	Millions	Annual increase (%)	Millions	Annual increase (%)	Millions	Annual increase (%)	Millions	Annual increase (%)	Millions	Annual increase (%)
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	458	4.6	1 511 680	3.0	15.8	0.6	87 010	-0.8	2 480	-0.4	231 410	1.8
1999	489	6.8	1 613 990	6.8	17.2	8.9	92 680	6.5	2 480	0.0	246 230	6.4

Source: ICAO Air Transport Reporting Form A-1.

Table 5-4. Operating and net results[1]

(scheduled airlines of ICAO Contracting States, 1988-1999)[2]

			Operating result		Net result[3]			
Year[4]	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)
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	295 500	279 600	15 900	5.4	8 200	2.8	10	-4 800
1999[4]	306 600	294 050	12 550	4.1				

1. Revenues and expenses are estimated for non-reporting airlines.
2. Up to and including 1997, it excludes 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.

Table 5-5. Distribution of operating revenues and expenses
(scheduled airlines of ICAO Contracting States[1],
total domestic and international services, 1988 and 1998)

Description	Distribution by item (per cent) 1988	1998	Change in per cent share of item 1988 to 1998
OPERATING REVENUES			
Scheduled services (total)	89.6	87.3	-2.3
Passenger	76.6	76.5	-0.1
Freight	11.8	10.0	-1.8
Mail	1.2	0.8	0.4
Non-scheduled operations	3.8	3.3	-0.5
Incidental	6.6	9.4	2.8
TOTAL	100.0	100.0	
OPERATING EXPENSES			
Direct aircraft			
Flight operations (total)	25.2	26.9	1.7
Flight crew	6.7	8.0	1.3
Fuel and oil	13.3	10.4	-2.9
Other	5.2	8.5	3.3
Maintenance and overhaul	11.6	11.1	-0.5
Depreciation and amortization	7.9	6.5	-1.4
Sub-total	44.7	44.5	-0.2
Indirect			
User charges and station expenses (total)	18.2	17.9	-0.3
Landing and associated airport charges	3.8	4.4	0.6
En-route facility charges	1.6	3.0	1.4
Station expenses	12.7	10.4	-2.3
Passenger services	10.2	10.7	0.5
Ticketing, sales, promotion	17.4	14.3	-3.1
General, administrative and other operating expenses	9.5	12.6	3.1
Sub-total	55.3	55.5	0.2
TOTAL	100.0	100.0	

1. Excludes operations within the Commonwealth of Independent States.

Source: ICAO Air Transport Reporting Form EF-1.

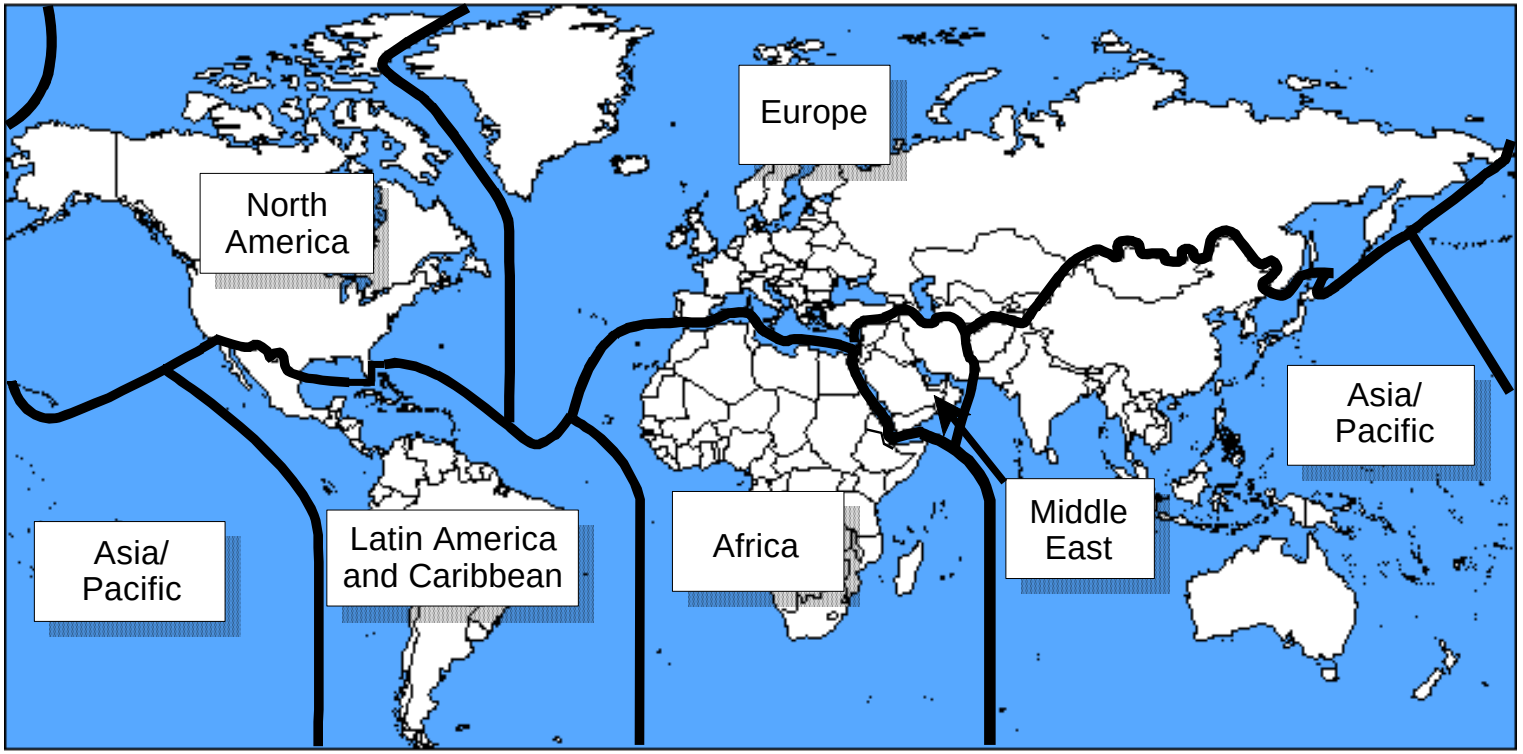
Table 5-6. ICAO scheduled passenger traffic forecast
(passenger-kilometres performed, 2000-2002)

Region of airline registration	ACTUAL 1988 (billions)	ACTUAL 1998 (billions)	Average annual growth (%)	ESTIMATED 1999 (billions)	Growth (%)	FORECAST 2000 (billions)	Growth (%)	2001 (billions)	Growth (%)	2002 (billions)	Growth (%)
Africa	38.1	55.7	3.9	61.7	10.8	65.1	5.5	68.9	5.8	72.8	5.7
Asia/Pacific	309.2	622.7	7.3	665.5	6.9	712.1	7.0	764.8	7.4	819.8	7.2
Europe	508.2	692.6	3.1	743.0	7.3	793.5	6.8	838.8	5.7	884.0	5.4
Middle East	45.6	78.4	5.6	79.1	0.9	83.1	5.0	86.8	4.5	90.8	4.6
North America	725.8	1 042.3	3.7	1 104.9	6.0	1 159.0	4.9	1 206.6	4.1	1 254.8	4.0
Latin America/ Caribbean	78.7	136.0	5.6	136.8	0.6	143.6	5.0	152.1	5.9	162.2	6.6
World	1 705.6	2 627.7	4.4	2 791.0	6.2	2 956.4	5.9	3 117.9	5.5	3 284.4	5.3

PART III

REGIONAL PERSPECTIVES, 1999 TO 2002

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 1999, the economic environment over the period since 1988 and anticipated through to 2002, and airline finances and passenger traffic trends over the period since 1988, and presents scheduled passenger traffic forecasts for the airlines of each region through to 2002. 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 1999

Table 6-1. Scheduled airline traffic — Africa (1999/1998)

	International			Total		
	1999	Increase over 1998 (%)	Share of world traffic (%)	1999	Increase over 1998 (%)	Share of world traffic (%)
Passengers carried (thousands)	17 480	8.4	3.6	30 450	4.5	2.0
Passenger-kilometre performed (millions)	52 550	10.2	3.3	60 920	8.8	2.2
Freight and mail tonne-km performed (millions)	1 940	11.1	2.0	2 000	11.3	1.8

Source: ICAO Air Transport Reporting Form A-1.

6.2 Continuing market reforms provided opportunities for the development of air transport of the region. These reforms included privatization programmes and improvement of regulatory and legal frameworks as well as tax and tariff regimes.

6.3 African Ministers responsible for civil aviation met in Yamoussoukro, Cote d'Ivoire, in November 1999 under the auspices of the UN Economic Commission for Africa and the Government of Cote d'Ivoire to examine the challenges and constraints facing the air transport sector in Africa. In the Declaration of Yamoussoukro II, the Ministers adopted a decision for a gradual liberalization of scheduled and non-scheduled intra-African air transport services.

6.4 COMESA, an African sub-regional organization, made a decision on a joint implementation of CNS/ATM services in the member States' upper airspace. Similarly, EAC and SADC initiated independent studies on upper airspace traffic management in their respective sub-regions.

6.5 New civil aviation administrations were established in two African States to improve the overall efficiency and financial results. The African airline industry continued to face challenges arising from the establishment of global alliances and increased competition. Increased regional cooperation through code-sharing, franchising and other commercial arrangements intensified. South African Airways and Kenya Airways continued to play a leading role in those developments.

Economic trends

6.6 Over the 1988-1998 period, the aggregate African economy grew at an average annual rate of 2.5 per cent (GDP in real terms), although GDP per capita declined at a rate of 0.3 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 macro-economic 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). In 1999 Africa's economic growth softened slightly reaching 2.7 per cent.

6.7 The economic performance of the African region is expected to improve over the medium term. The aggregate GDP is anticipated to grow at 4.5, 4.7 and 4.3 per cent for the years 2000, 2001, and 2002 respectively. Underlying these projections are reforms for economic diversification and liberalization to strengthen the private sector, rise domestic savings, expand non-oil exports and consolidate successfully domestic and international economic policies.

Airline financial trends

6.8 Over the 1988-1998 period, operating revenues (in dollars) of the scheduled airlines of the African region increased at an average annual rate of 1.6 per cent (compared to world annual average of 5.9 per cent). Operating expenses for the same period increased by 1.8 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 1988-1998 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 4.8 per cent in real terms (compared to a 2.9 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.

Airline passenger traffic trends and forecast

6.10 Over the 1988-1998 period, scheduled passenger traffic (in PKPs) of the airlines of the African region increased at an average annual rate of 3.9 per cent (compared to the world annual average of 4.4 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 6.1 per cent growth in 1997. This trend reversed in 1998 with traffic declining by 0.9 per cent (compared to world average growth of 2.1 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 5.5, 5.8 and 5.7 per cent for the years 2000, 2001 and 2002, respectively, close to the levels of passenger traffic growth worldwide.

ASIA/PACIFIC

The Region in 1999

Table 6-2. Scheduled airline traffic — Asia/Pacific (1999/1998)

	International			Total		
	1999	Increase over 1998 (%)	Share of world traffic (%)	1999	Increase over 1998 (%)	Share of world traffic (%)
Passengers carried (thousands)	106 810	8.0	21.8	340 590	5.0	21.9
Passenger-kilometre performed (millions)	462 280	8.4	28.6	665 510	6.9	23.9
Freight and mail tonne-km performed (millions)	35 300	9.9	37.1	38 630	9.9	34.0

Source: ICAO Air Transport Reporting Form A-1.

6.12 The Second Meeting of Directors General of Civil Aviation of Cambodia, Lao PDR, Myanmar and Viet Nam, held in February 1999 in Hanoi, agreed to develop a long-term plan of action for the sub-region. This plan would include the harmonization of rules and procedures to facilitate air transportation of passengers, freight and mail, the development of relevant arrangements for cooperation and assistance in airport, airline and air navigation fields, the undertaking of programmes and projects to ensure aviation safety and security within the sub-region in conformity with ICAO SARPs, and the development of a multilateral agreement on air transport liberalization within the sub-region.

6.13 Following conclusions of the first South Pacific Forum Aviation Policy Ministerial Meeting (held in Fiji in 1998) on policy framework to manage the airspace of this sub-region as a unified airspace, ICAO approached the Asian Development Bank (ADB) for funds to develop proposals for such management. To that effect, a draft proposal of a technical cooperation project was developed by ICAO and submitted to ADB and the South Pacific Forum Secretariat.

6.14 In September 1999 the Ministers from South Pacific Forum member countries met for the second time in Nadi, Fiji, to further discuss the ways to enhance aviation safety and increase competitiveness of the sub-region's airline industry as well as the future airspace arrangements in the Pacific.

Economic trends

6.15 Over the 1988-1998 period, the Asia/Pacific economy (GDP) grew at an average annual rate of 4.2 per cent in real terms, and GDP per capita increased at 2.6 per cent, the highest growth rates of all ICAO regions. For more than 10 years Asia/Pacific has been the fastest growing region despite the recent slowdown and recession when GDP growth dropped from 5.4 per cent in 1996 to 3.9 per cent in 1997 and further to -0.3 per cent in 1998. In 1999 the region regained some of its economic strength with a GDP growth of 3.5 per cent. The year-to-year changes in the region's GDP and GDP per capita are illustrated in Figure 6-5.

6.16 The recovery process of the region's affected economics in 1999 was stronger and swifter than expected. Supporting factors were fiscal stimulus and growing final domestic demand, mainly public consumption and investment, rebuilding of inventories, particularly the rebound of the electronics industry, an important export-oriented sector for several of the regions' economies. Developing economies in the Asia/Pacific region continued to make a significant contribution as their average GDP grew at 6.0 per cent. Several developing economies in East and South-East Asia recovered from the 1998 recession as did Japan which saw its economy recovering only slowly with a GDP growth of 0.3 per cent.

6.17 The regained growth of the Asia/Pacific economy is projected to continue and become more uniformly balanced between the advanced and developing countries. It is anticipated that the regions growth potential remains very strong assuming that supporting reforms can take effect further on. The Japanese economic recovery remains modest but is expected to gain some momentum.

6.18 For the entire Asia/Pacific region, in real terms the GDP is expected to grow at 3.9 per cent in 2000 and a further increase in 2001 and 2002, with expected growth rates of 4.4 and 4.3 per cent, respectively.

Airline financial trends

6.19 Over the 1988-1998 period, operating revenues of the scheduled airlines of the Asia/Pacific region increased at an average annual rate of 6.1 per cent (compared to the world average annual growth rate of 5.9 per cent). Operating expenses for the same period increased by 6.9 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 1999 of the Asia/Pacific airlines was around $3 000 million, significantly higher than that of 1998.

6.20 Average scheduled passenger yields for airlines of the region, measured in terms of cents per PKP, have fluctuated significantly since 1988 and resulted in an annualized decline of 4.4 per cent during the 1988-1998 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.

Airline passenger traffic trends and forecast

6.21 Over the 1988-1998 period, scheduled passenger traffic (in PKPs) of airlines of the Asia/Pacific region increased at the average annual rate of 7.3 per cent, significantly higher than the world's annual average of 4.4 per cent. Having exhibited the highest growth rates among all ICAO regions for almost a decade, in 1998 airlines of the region experienced a decline in traffic by 2.6 per cent, dampening the world traffic growth which averaged at a low 2.1 per cent. As a result of the speedy economic recovery in the Asian economies affected by the 1997/1998 recession, and revived demand for air travel and freight, traffic is estimated to have increased by almost 7.0 per cent in 1999. The year-to-year traffic growth comparison between world and Asia/Pacific airlines is shown in Figure 6-8.

6.22 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 continue with their regained growth potential at rates of 7.0, 7.4 and 7.2 per cent for the years 2000, 2001 and 2002, respectively, compared to the world airline growth of 5.9, 5.5 and 5.3 per cent.

EUROPE

The Region in 1999

Table 6-3. Scheduled airline traffic — Europe (1999/1998)

	International			Total		
	1999	Increase over 1998 (%)	Share of world traffic (%)	1999	Increase over 1998 (%)	Share of world traffic (%)
Passengers carried (thousands)	236 730	7.5	48.4	395 380	6.2	25.4
Passenger-kilometre performed (millions)	622 790	7.5	38.6	742 970	7.3	26.6
Freight and mail tonne-km performed (millions)	31 240	5.0	32.8	32 160	4.9	28.3

Source: ICAO Air Transport Reporting Form A-1.

6.23 Work continued within ECAC on the further development of the SAFA (Safety Assessment of Foreign Aircraft) Programme in close cooperation with the ICAO Universal Safety Oversight Audit Programme. In this connection, the President of the ICAO Council and the President of ECAC signed, on 26 May 1999 in Montreal, a Memorandum of Understanding for Cooperation on Safety Oversight Audits and Related Matters, thus strengthening the link between ICAO and ECAC safety programmes.

6.24 Work to enhance the overall level of aviation security in ECAC, including one stop security, continued. The first agreement relating to the mutual recognition of aviation security measures was signed by Belgium and Switzerland on 12 January 1999 and entered into force on 1 June 1999.

6.25 A model clause for inclusion in bilateral air transport agreements relating to airline ownership and control issues was developed by ECAC. Work on the revision of the ECAC Code of Conduct for Computer Reservation Systems (CRS) in the light of EC Regulation 323/99 was initiated.

6.26 On 21 June 1999 seven sectoral agreements, including air transport agreement, were signed between The European Union and Switzerland. When the air transport agreement enters into force, Switzerland, to a large extent, will be integrated into the Single European Market in the air transport sector.

6.27 Negotiations between the European Union, Iceland, Norway and ten Central and Eastern European countries to establish a European Common Aviation Area (ECAA) continued. The multilateral main agreement is close to being finalized, while negotiations with individual Central and Eastern countries on protocols establishing transitional arrangements have been agreed with most of these countries.

Economic trends

6.28 The European GDP grew throughout the 1980s, had reached a steady growth by 1988 and 1989 but went into decline starting in 1990. By1997, total output was back to where it had been in 1989, the primary reason being the serious decline in the economies of Eastern Europe and the CIS beginning in 1990. For the 10-year period 1988 – 998 the recessionary impact of the early 1990s led to zero economic growth in Europe masking a persistent divergence between countries in Western and Eastern Europe. The aggregate GDP per capita for the whole region (including the CIS) declined by about 0.5 per cent during this period. Figure 6-9 illustrates the annual European changes in GDP and GDP per capita.

6.29 With a GDP growth of 2.3 per cent for Europe as a whole in 1999 the stabilization is expected to continue. Economies of Central and Eastern European Countries grew in the aggregate around 2.5 per cent, while most countries of the Commonwealth of Independent States (CIS) achieved GDP growth, averaging 2.9 per cent, a turn-around following several years of economic declines. GDP growth rates for Europe are forecast to be 3.2, 2.9 and 2.8 per cent for 2000, 2001 and 2002, respectively. Even stronger growth is envisaged if supportive macro-economic policies were to materialize. However, an unusually high uncertainty associated with the economic outlook for the region prevails because of the ongoing structural changes in the "economies in transition".

Airline financial trends

6.30 Over the 1988-1998 period, operating revenues of the scheduled airlines of the European region (excluding operations within the CIS) increased at an average annual rate of 6.7 per cent (comparable to the world annual average rate of 5.9 per cent). Operating expenses for the same period increased by 7.0 per cent per annum. As illustrated in Figure 6-10, positive operating results were achieved in 1988 and 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 1994. Since then, profitability in the European airline industry has improved progressively with net profits at 3.7 per cent for 1998 and an estimated operating profit at 1.6 per cent for 1999.

6.31 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 1988-1998, the annualized ten-year average showed a 3.2 per cent decline in yield, close to the world result of 2.9 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). 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). It is estimated that the yields in 1999 declined in real terms.

Airline passenger traffic trends and forecast

6.32 Over the 1988-1998 period, scheduled passenger traffic (in PKPs) of the airlines of the European region increased at an average annual rate of 3.1 per cent (compared to the world annual average of 4.4 per cent) despite a generally impressive performance in Western Europe (except in 1991). If airlines of the CIS are excluded, European traffic grew at 8.1 per cent per annum over the period. Reported CIS traffic volumes dropped dramatically, on average by 12.5 per cent each year over the last decade with PKPs in 1998 at only about 26 per cent of those in 1988. A less severe decline of CIS traffic volume continued in 1998 and 1999, whereas European traffic excluding the CIS grew at an estimated rate of 7.3 per cent in 1999. 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.

6.33 As shown in Table 5-6 and illustrated in Figure 6-12, scheduled passenger traffic for the region as a whole is expected to grow annually at rates of 6.8, 5.7 and 5.4 per cent for the years 2000, 2001 and 2002, respectively (compared to world airline growth of 5.9, 5.5 and 5.3 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 2002.

MIDDLE EAST

The Region in 1999

Table 6-4. Scheduled airline traffic — Middle East (1999/1998)

	International			Total		
	1999	Increase over 1998 (%)	Share of world traffic (%)	1999	Increase over 1998 (%)	Share of world traffic (%)
Passengers carried (thousands)	22 790	1.2	4.7	39 230	-1.4	2.5
Passenger-kilometre Performed (millions)	67 670	2.5	4.2	79 070	0.8	2.8
Freight and mail tonne-km performed (millions)	4 040	-0.7	4.2	4 150	-0.5	3.6

Source: ICAO Air Transport Reporting Form A-1.

6.34 Political instability and tensions within the Middle East continued to have an adverse impact on tourism and air transport developments in the region.

6.35 ACAC continued to work out a mutual approach of the region to the trade in services issue and joint responses to regional and sub-regional air transport developments. A number of airlines in the region (Egypt Air, Gulf Air, Saudia, Oman Air and Qatar Airways) embarked on fleet expansion and modernization programmes. Leasing programmes were adopted by Sudan Airways, Yemen Airways and Royal Jordanian.

Economic trends

6.36 The Middle East economy has been characterized by several pronounced cycles over the past decade, as illustrated in Figure 6-13 which presents the year-to-year changes in the region's GDP and GDP per capita over the 1988-1998 period. 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. From 1988-1998, the aggregate GDP for the Middle East grew at an average annual rate of 3.5 per cent in real terms, while GDP per capita levelled off at 0.8 per cent per annum. In 1999 the economy of the region remained basically stable with a GDP growth of 2.5 per cent compared to the previous year.

6.37 Prospects for this region particularly depend on oil market developments and fiscal consolidation policies. In this regard the recent increase of the international oil price has improved the economic prospect of the region significantly. GDP growth is now estimated at 4.9 per cent in 2000 and 4.3 per cent and 4.4 per cent for 2001 and 2002, respectively. At the same time the dependency on the international oil market demonstrates the need to go ahead with reforms for economic diversification and liberalization in order to promote private-sector-led growth in non-oil industries.

Airline financial trends

6.38 Over the 1988-1998 period, operating revenues of the scheduled airlines of the Middle East region increased at an average annual rate of 5.2 per cent (compared to the world annual average of 5.9 per cent). Operating expenses for the same period increased by 4.8 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 1999 of about $230 million.

6.39 For the 1988-1998 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 3.5 per cent in real terms (compared to a 2.9 per cent decline for the world), with an exceptional increase in 1991. It is estimated that real yield increased in 1999 accompanied by a small 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

6.40 Over the 1988-1998 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.

6.41 As shown in Table 5-6 and illustrated in Figure 6-16, scheduled passenger traffic for the airlines of the Middle East region is expected to grow by 5.0 per cent per annum in 2000, 4.5 per cent in 2001 and 4.6 per cent in 2002. This rate reflects an expected good economic performance in the region.

NORTH AMERICA

The Region in 1999

Table 6-5. Scheduled airline traffic — North America (1999/1998)

	International			Total		
	1999	Increase over 1998 (%)	Share of world traffic (%)	1999	Increase over 1998 (%)	Share of world traffic (%)
Passengers carried (thousands)	75 520	5.6	15.4	656 250	7.4	42.1
Passenger-kilometre performed (millions)	327 740	5.6	20.3	1 104 880	6.0	39.6
Freight and mail tonne-km performed (millions)	19 090	7.4	20.1	32 460	5.0	28.5

Source: ICAO Air Transport Reporting Form A-1.

6.42 A number of bilateral open skies air transport agreements were concluded between the United States and other countries. Such agreements were reached with Portugal, Dominican Republic, Tanzania, Qatar, Argentina, Bahrain, United Arab Emirates and Pakistan. Arrangements on the operation of air transport services were agreed upon between the United States and China, Mexico and the Russian Federation. They covered capacity, routes, frequencies, code-sharing, designation, overflights and simpler filing.

Economic trends

6.43 The economic expansion in the U.S. economy which began in 1991 has been the longest since the Second World War. Over the 1988-1998 period the North America 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. The year-to-year changes in the region's GDP and GDP per capita are illustrated in Figure 6-17.

6.44 During 1999 the North American economy showed continued strength and is estimated to grow by 4.2 per cent. While modestly improving exports were still influenced by weak overseas markets, especially in Asia, strong domestic demand helped offset much of that softness. It is forecast that the robust growth of the U.S. economy will last during 2000 and support a strong regional performance at a rate of 4.5 per cent although expectations are that the consumer price index might begin to rise. The North American economy is expected to expand at lower rates of 3.5 per cent and 3.4 per cent for the years 2001 and 2002, respectively.

Airline financial trends

6.45 Over the 1988-1998 period, operating revenues of the scheduled airlines of the North American region increased at an average annual rate of 5.5 per cent (compared to the world annual average of 5.9 per cent). Operating expenses for the same period increased by 5.1 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 1999 an operating surplus of $7.5 billion has been estimated.

6.46 For the 1988-1998 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 2.3 per cent in real terms (compared to a 2.9 per cent decline for the world). It is estimated that in 1999, 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.

Airline passenger traffic trends and forecast

6.47 Over the 1988-1998 period, scheduled passenger traffic (in PKPs) of the airlines of the North American region increased at an average annual rate of 3.7 per cent (compared to the world average of 4.4 per cent). The estimated increase in 1999 was 6.0 per cent, significantly higher than the average for the decade 1988-1998. 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 4.9 per cent in 2000, 4.1 per cent in 2001 and 4.0 per cent in 2002. Although these forecast rates are below the expected growth pattern for the world as a whole (5.9, 5.5 and 5.3 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 1999

Table 6-6. Scheduled airline traffic — Latin America and the Caribbean (1999/1998)

	International			Total		
	1999	Increase over 1998 (%)	Share of world traffic (%)	1999	Increase over 1998 (%)	Share of world traffic (%)
Passengers carried (thousands)	29 560	3.4	6.0	95 630	1.7	6.1
Passenger-kilometre performed (millions)	80 960	-1.4	5.0	134 530	-0.3	4.8
Freight and mail tonne-km performed (millions)	3 550	-11.6	3.7	4340	-10.2	3.8

Source: ICAO Air Transport Reporting Form A-1.

6.49 The Caribbean States Association continued to work on common air transport policy to face the impact on the airline industry of the sub-region brought about by the developments taking place in other regions. At the same time the policy would aim at establishing conditions whereby the Caribbean airlines could enjoy fair opportunities to participate and compete in the operation of air services.

Economic trends

6.50 Over the 1988-1998 period, the aggregate Latin American and the Caribbean economy (GDP) grew at an average annual rate of 2.6 per cent in real terms, whereas GDP per capita grew at 0.8 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 regional economy started to decline dramatically to a 2.0 per cent growth in 1998 and further to an irreducible growth of 0.2 per cent in 1999. The financial market setbacks led Brazil to introduce severe austerity measures. Other countries in the region such as Peru, Ecuador, El Salvador, Honduras and Nicaragua suffered from the adverse affects of repeated natural disaster which resulted in constricted output, especially due to devastation in their agriculture sectors and industrial infrastructures, and consequently, declining exports and overall economic performance.

6.52 The economic performance of the region is expected to recover notably in 2000 reaching a growth of 4.0 per cent and to improve further to growth rates of 4.5 and 4.7 per cent in 2001 and 2002, respectively, all in all led by stronger domestic demand and by a revival in exports.

Airline financial trends

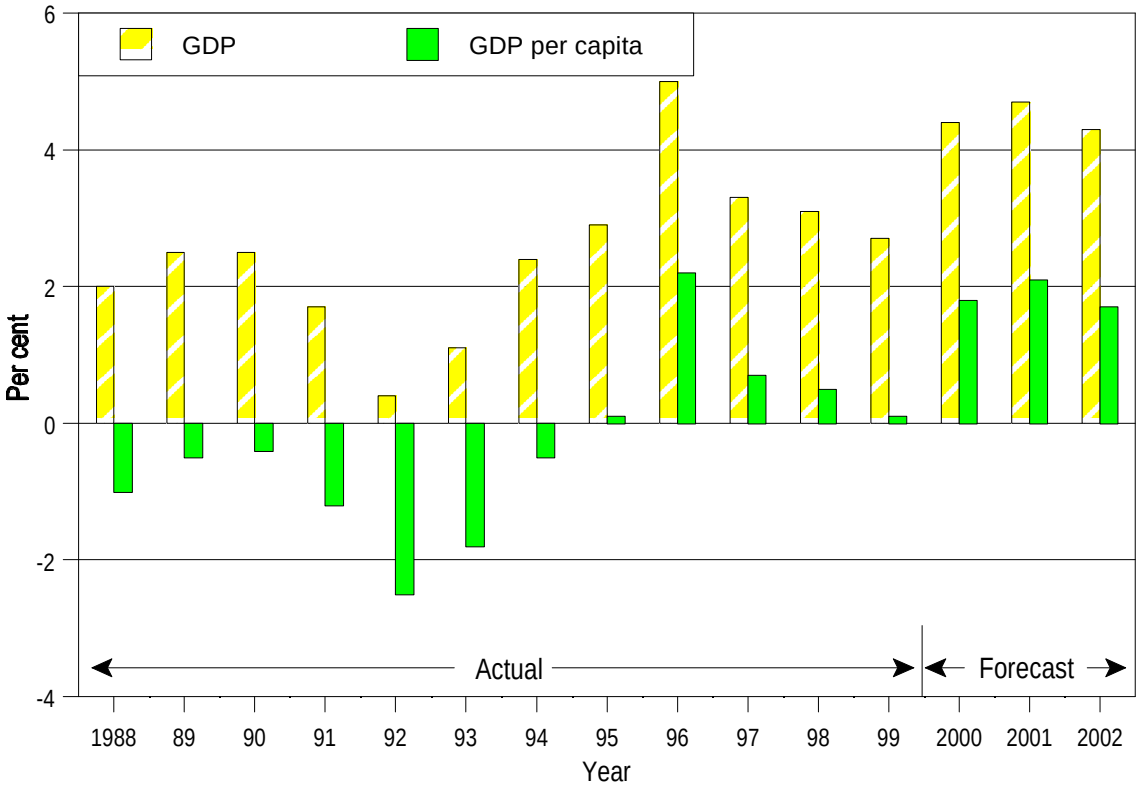
6.53 Over the 1988-1998 period, operating revenues of the scheduled airlines of the Latin American and the Caribbean region increased at an average annual rate of 7.1 per cent (compared to the world annual average of 5.9 per cent). Operating expenses for the same period increased by 7.1 per cent per 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 1997 and 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 1988 and 1998 and declined to about 1.6 per cent. 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 1988-1998 period, the scheduled passenger traffic (in PKPs) of airlines of the Latin American and the Caribbean region increased at an average annual rate of 5.6 per cent (compared to the world average growth rate of 4.4 per cent). In recent years, flag carrier privatization, intra-regional mergers and alliances along with extensive fleet and route 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. Following very high traffic growth rates for 1997 and 1998 (11.6 and 9.2 per cent respectively), the estimated traffic growth in 1999 dropped to 0.6 per cent. 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 5.0, 5.9 and 6.6 per cent in 2000, 2001 and 2002, respectively, which exceeds

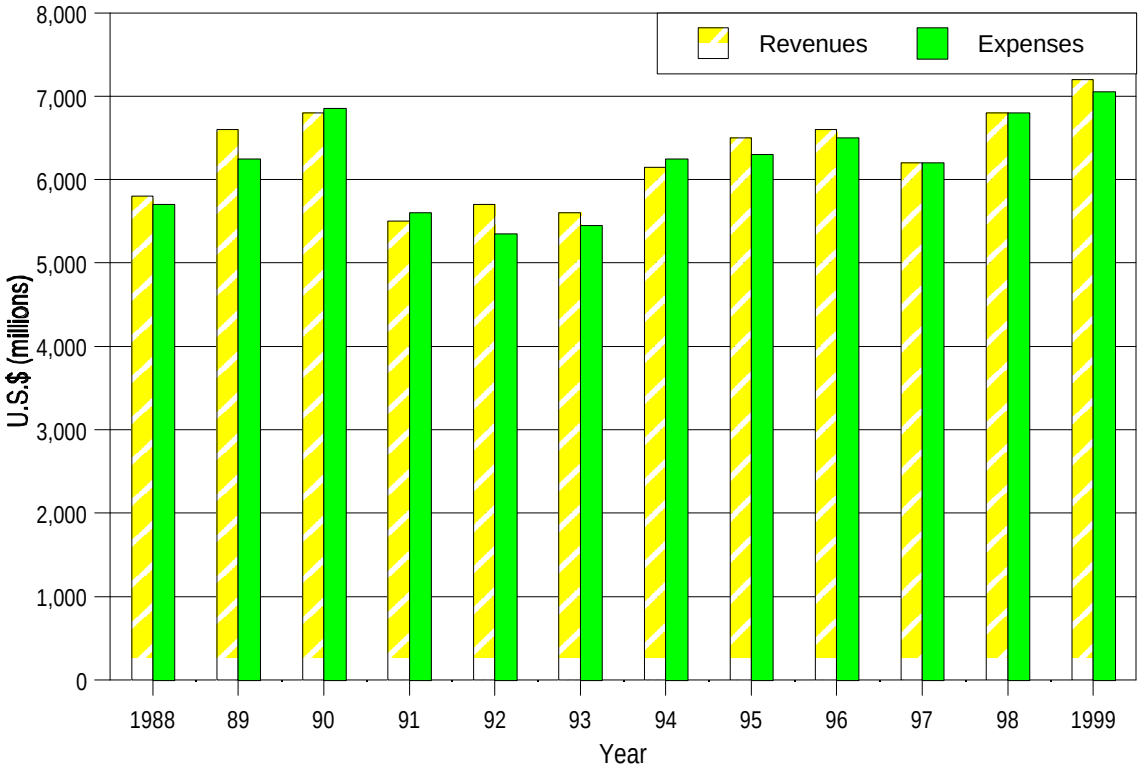


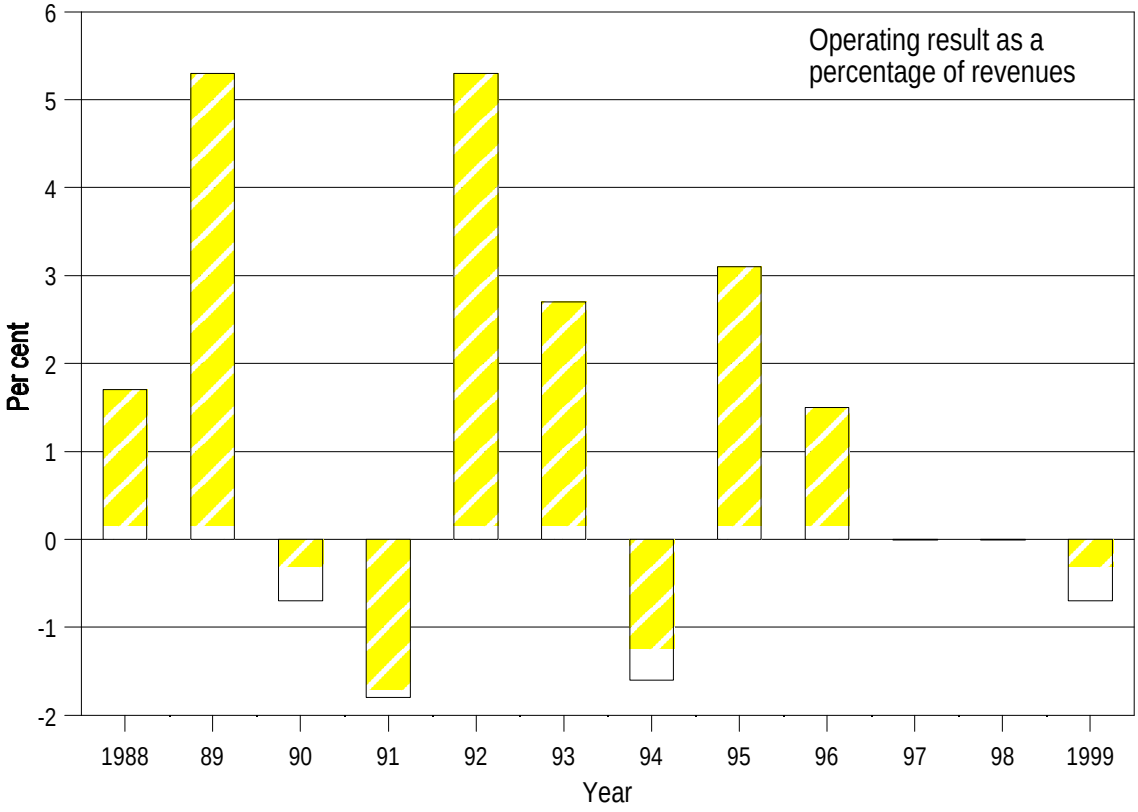
the expected growth trend for the world (5.9, 5.5 and 5.3 per cent).

Chapter 6 Graphs

Source: IMF, WEFA Group.

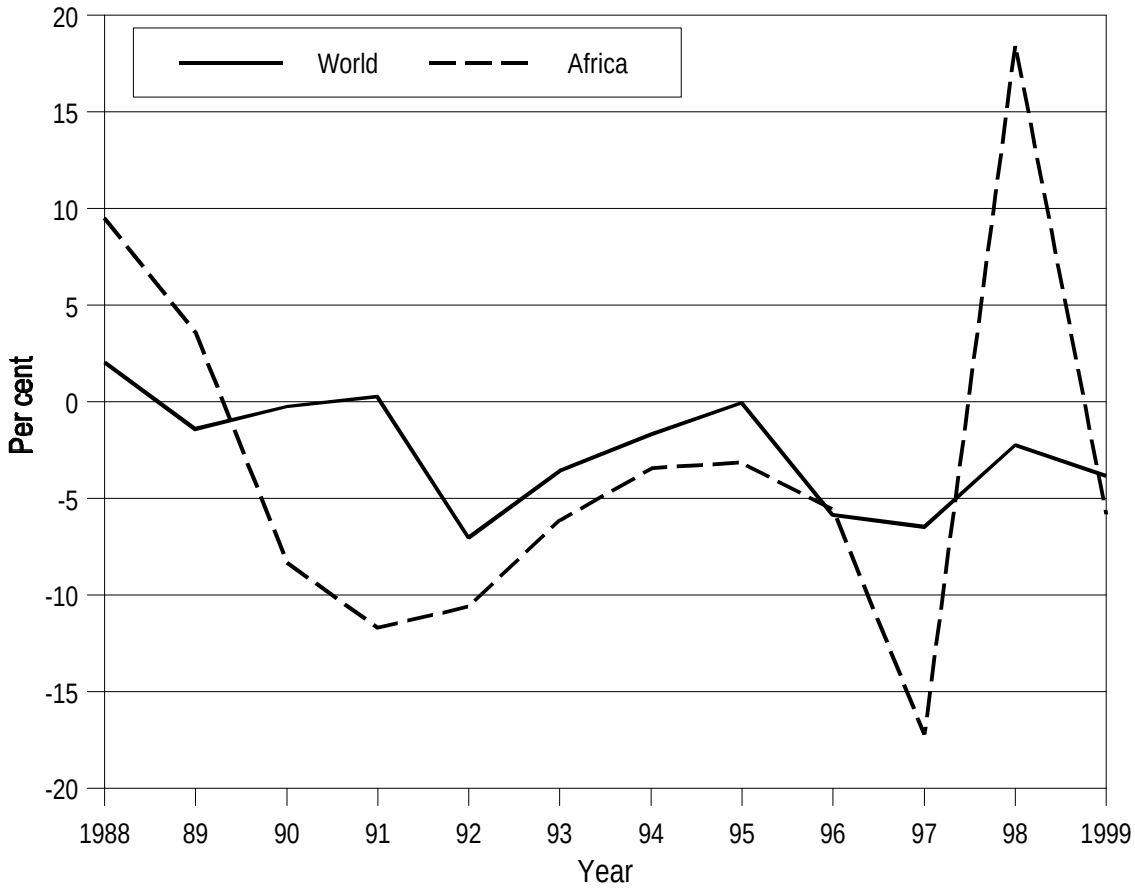
Figure 6-1. Annual change in real GDP and GDP per capita — Africa (1988-2002)





Note. — 1999 Figures are from estimated data.
Source: ICAO Air Transport Reporting Form EF-1.

Figure 6-2. Scheduled airline operating revenues and expenses — Africa (1988-1999)



Notes. — *1999 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 (1988-1999)

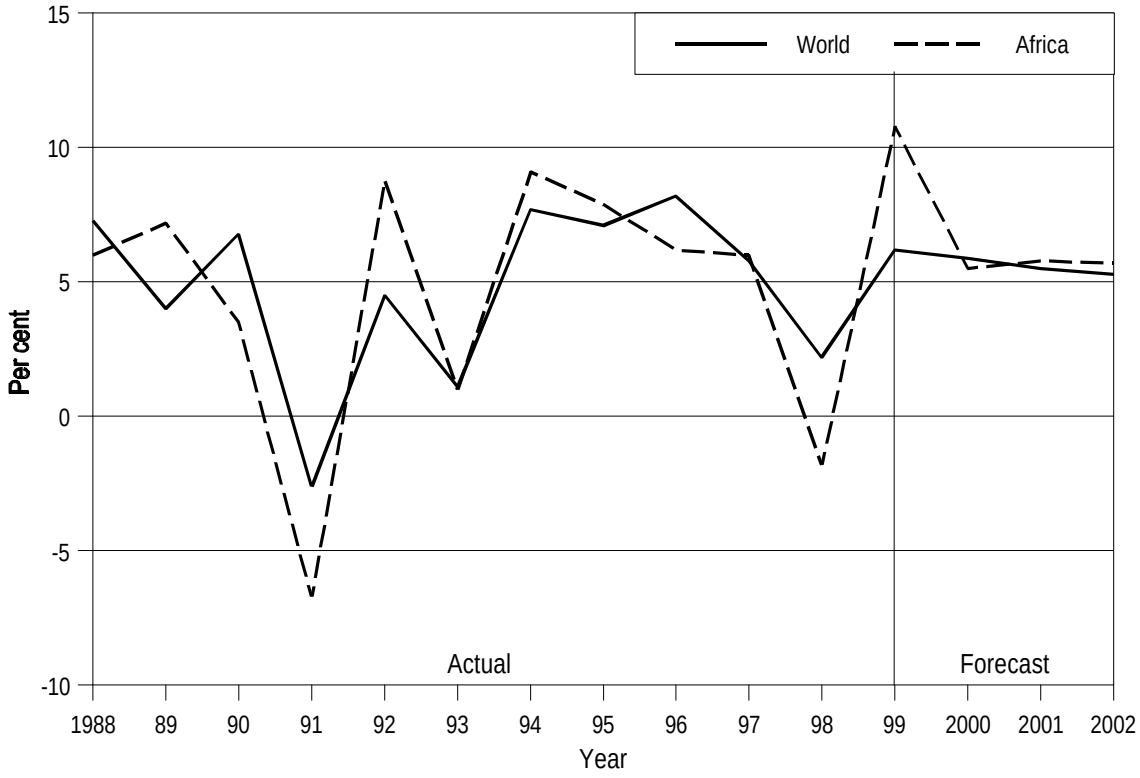
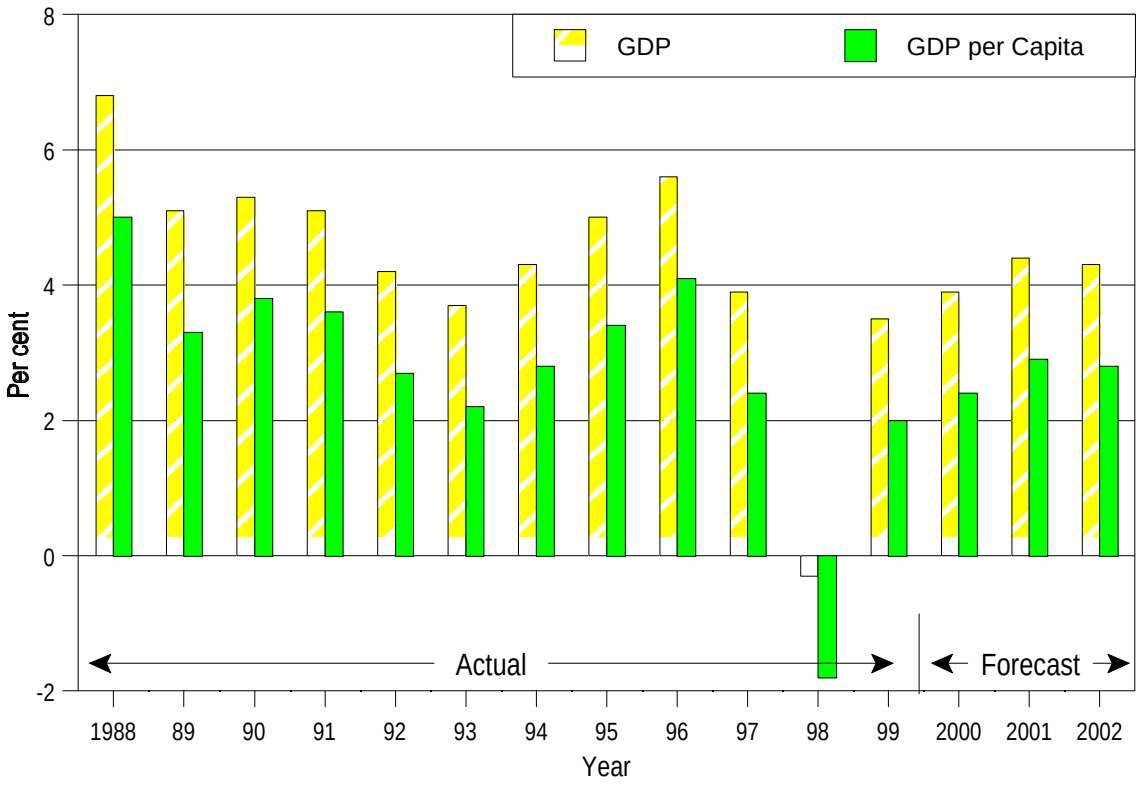
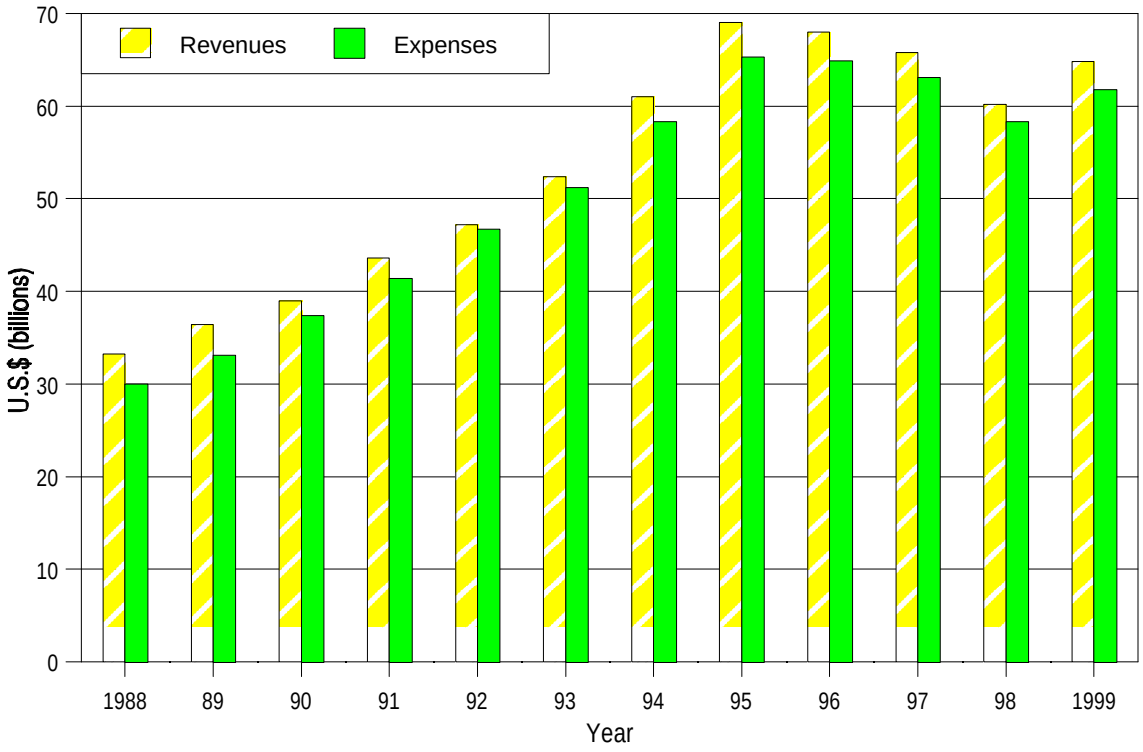


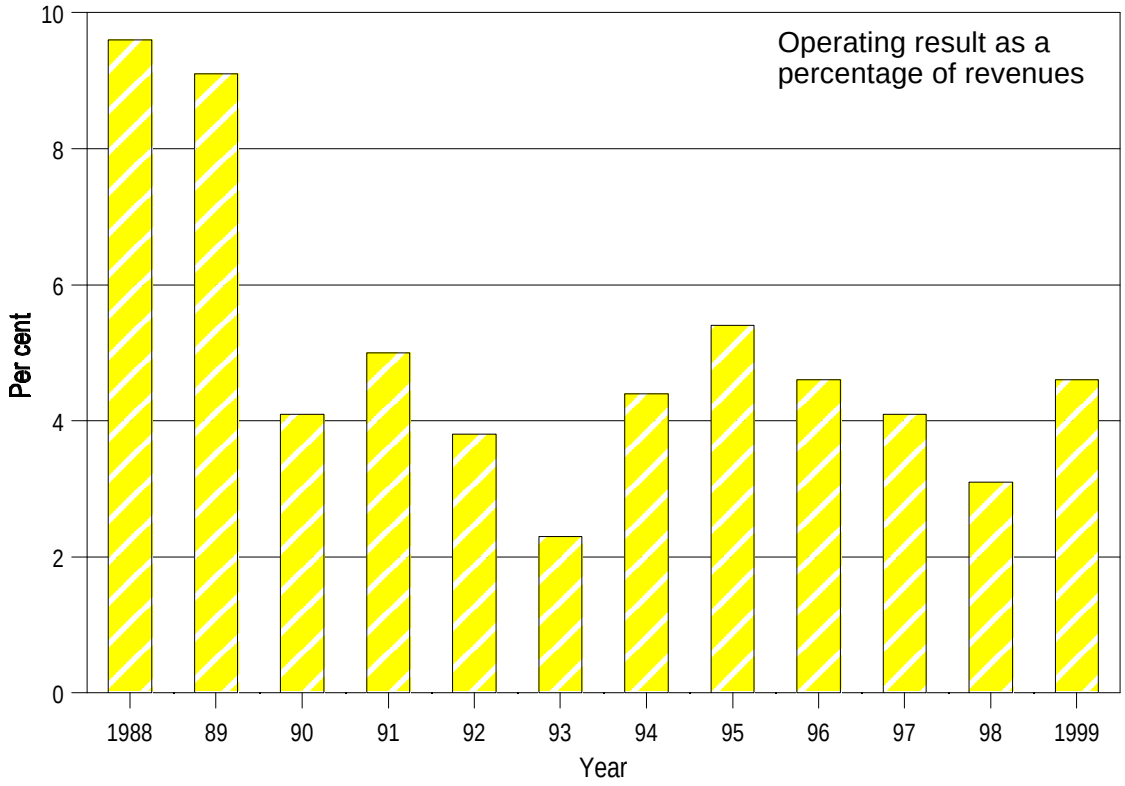
Figure 6-4. Scheduled passenger traffic growth (PKPs) — Africa and World (1988-2002)



Source: IMF, WEFA Group.

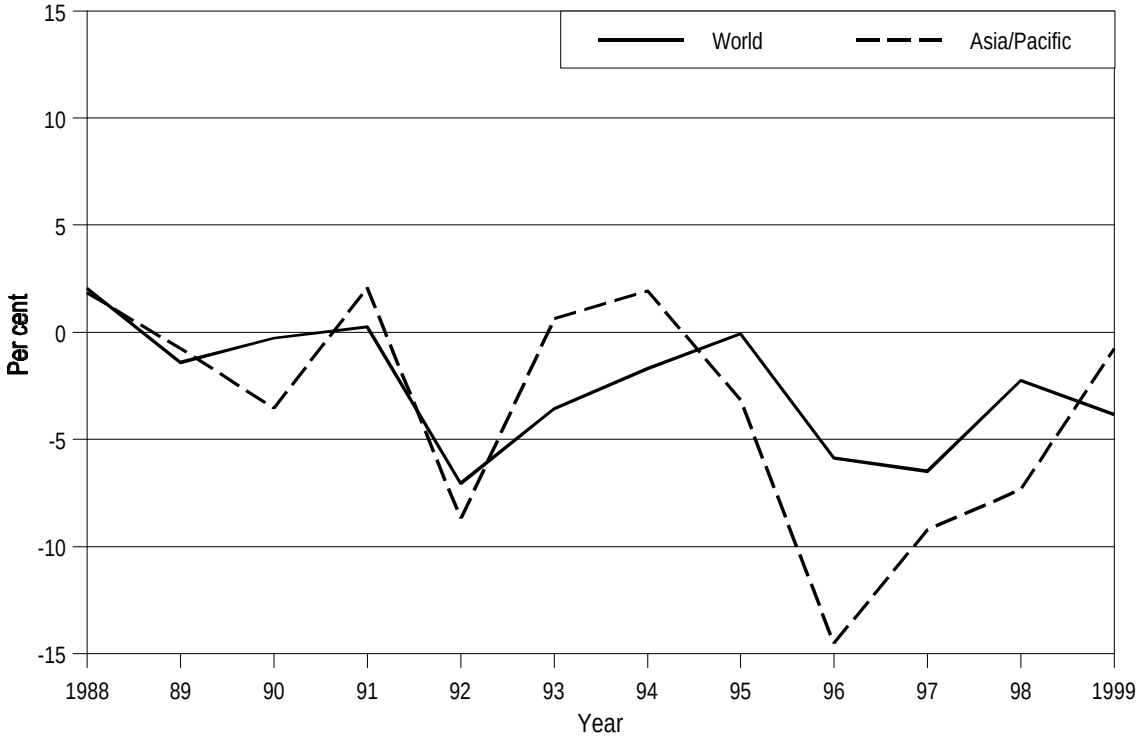
Figure 6-5. Annual change in real GDP and GDP per capita — Asia/Pacific (1988-2002)





Note. — 1999 Figures are from estimated data.
Source: ICAO Air Transport Reporting Form EF-1.

Figure 6-6. Scheduled airline operating revenues and expenses — Asia/Pacific (1988-1999)



Notes. — *1999 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 (1988-1999)

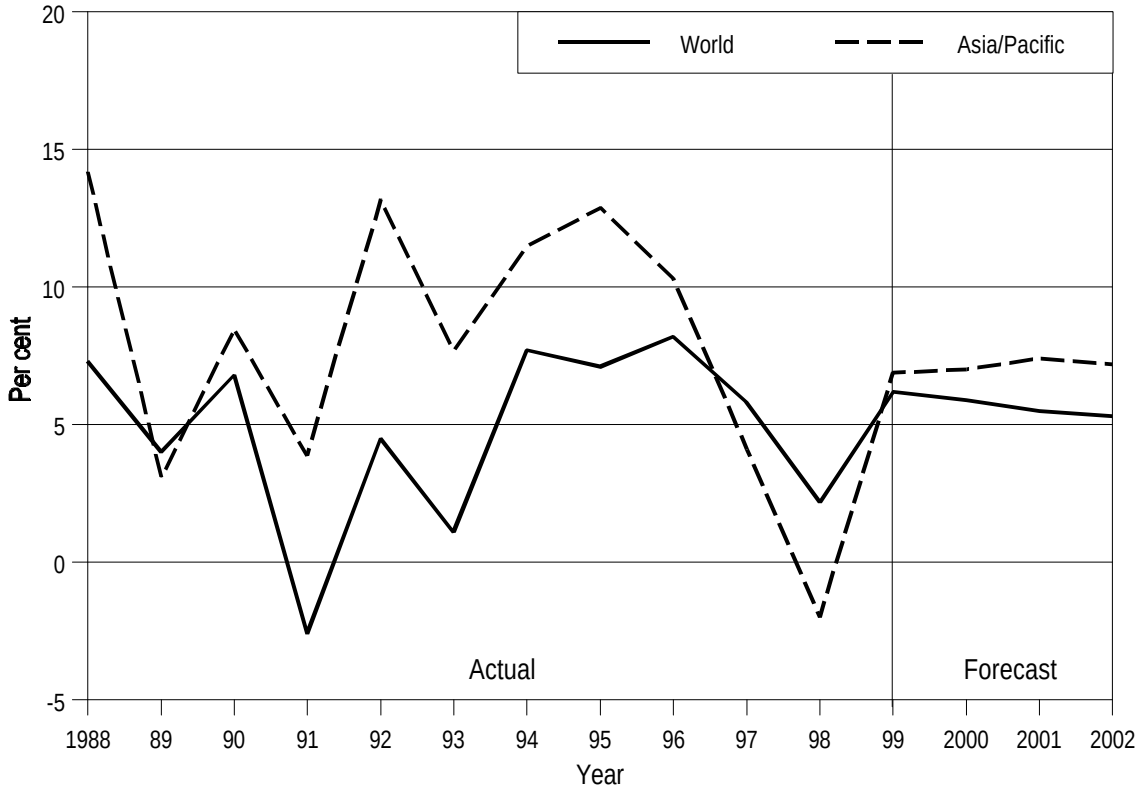
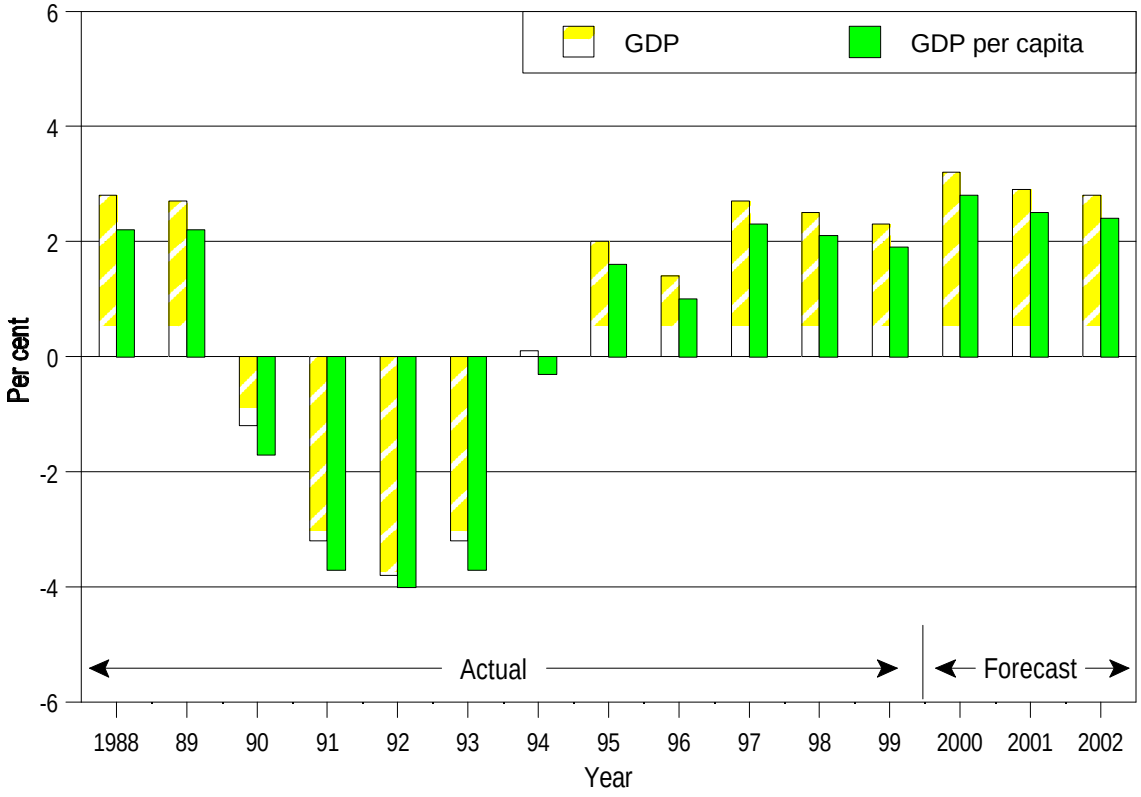
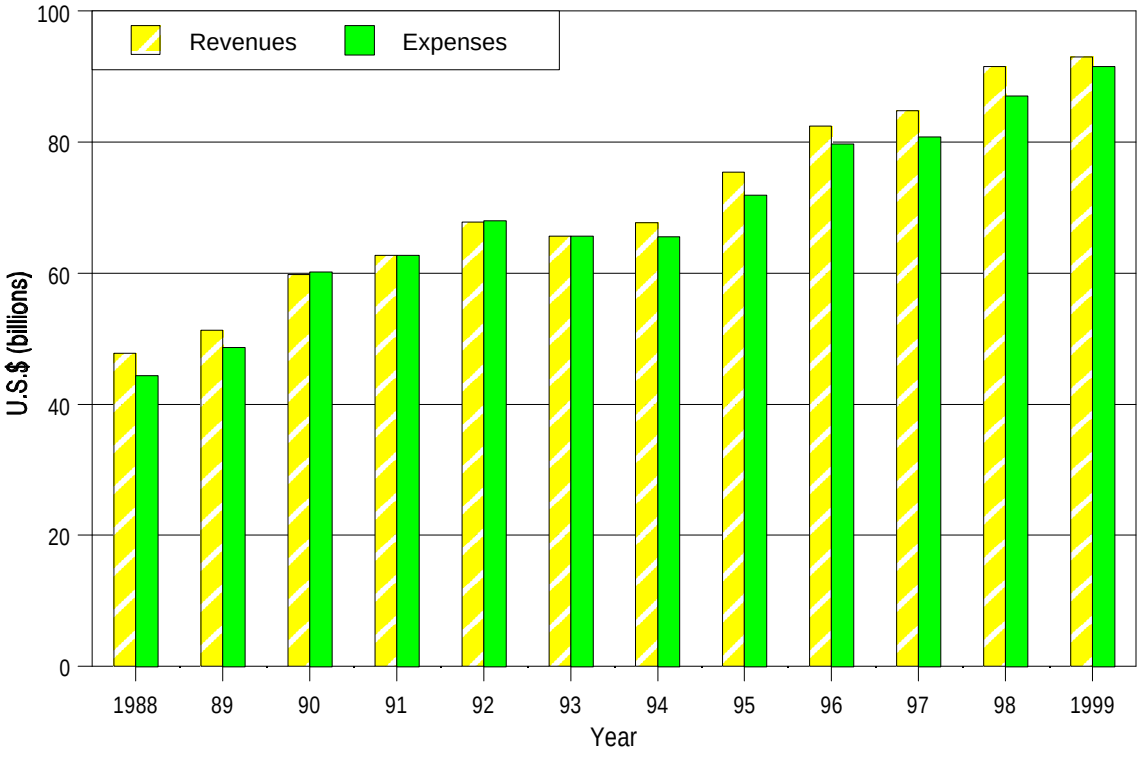


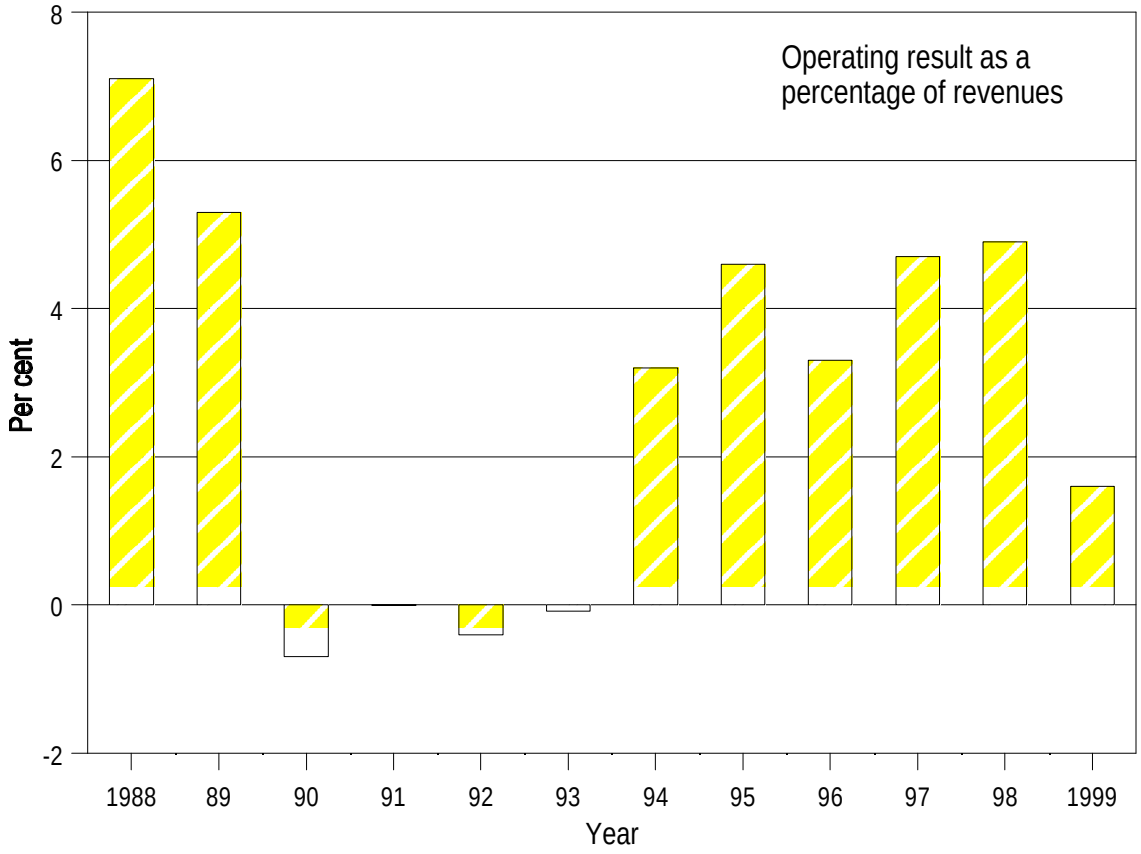
Figure 6-8. Scheduled passenger traffic growth (PKPs) — Asia/Pacific and World (1988-2002)



Source: IMF, WEFA Group.

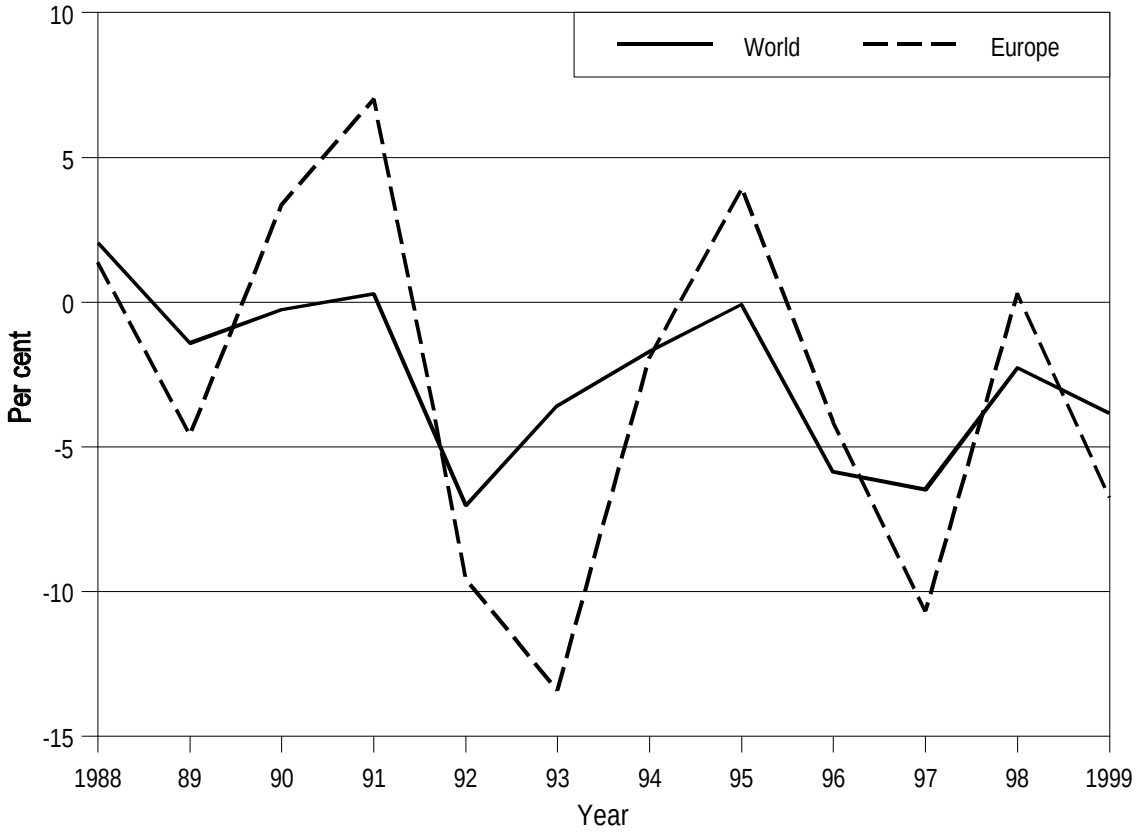
Figure 6-9. Annual change in real GDP and GDP per capita — Europe (1988-2002)





Note. — 1999 Figures are from estimated data.
Source: ICAO Air Transport Reporting Form EF-1.

Figure 6-10. Scheduled airline operating revenues and expenses — Europe (1988-1999)



Notes. — *1999 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 (1988-1999)

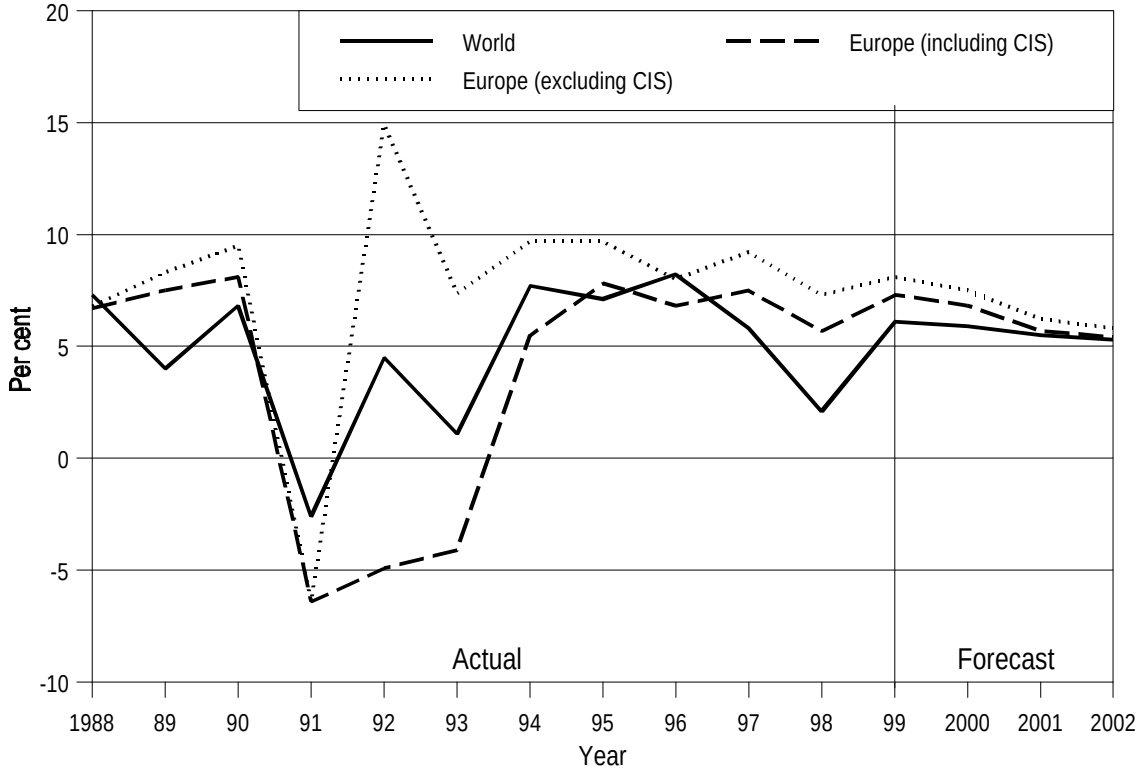
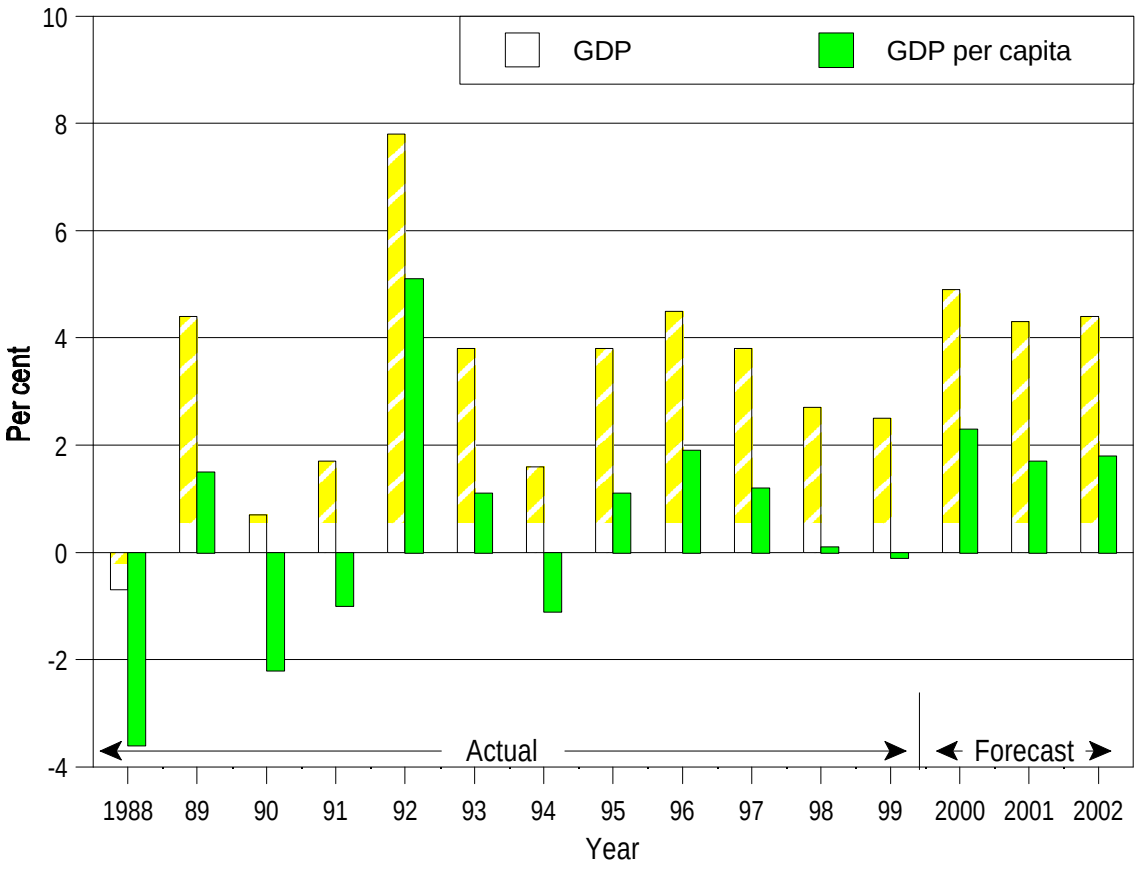
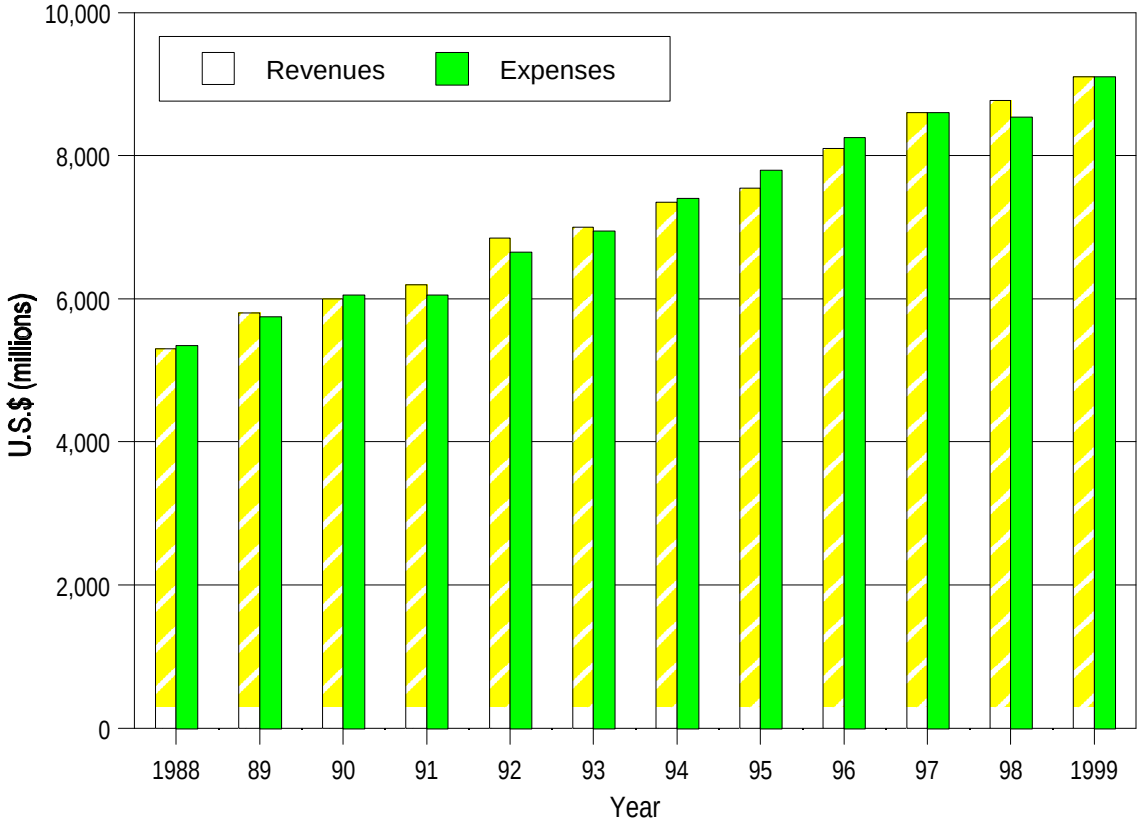


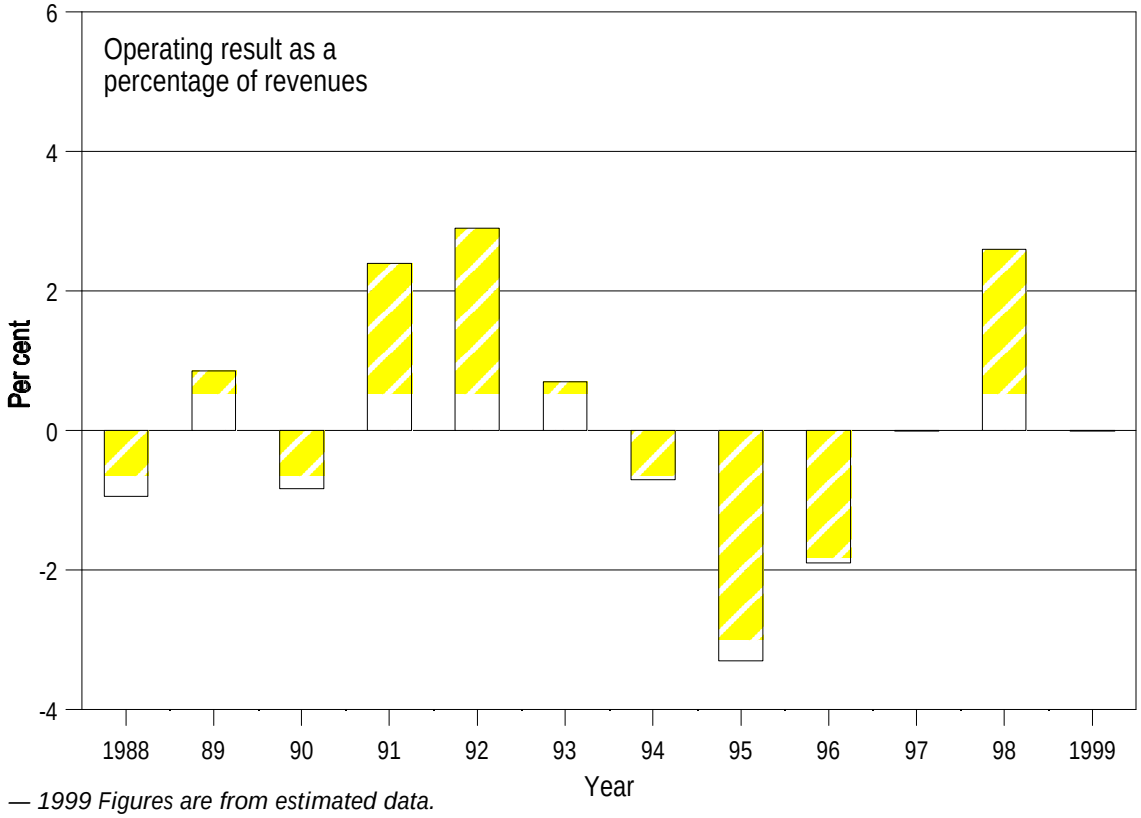
Figure 6-12. Scheduled passenger traffic growth (PKPs) — Europe and World (1988-2002)



Source: IMF, WEFA Group.

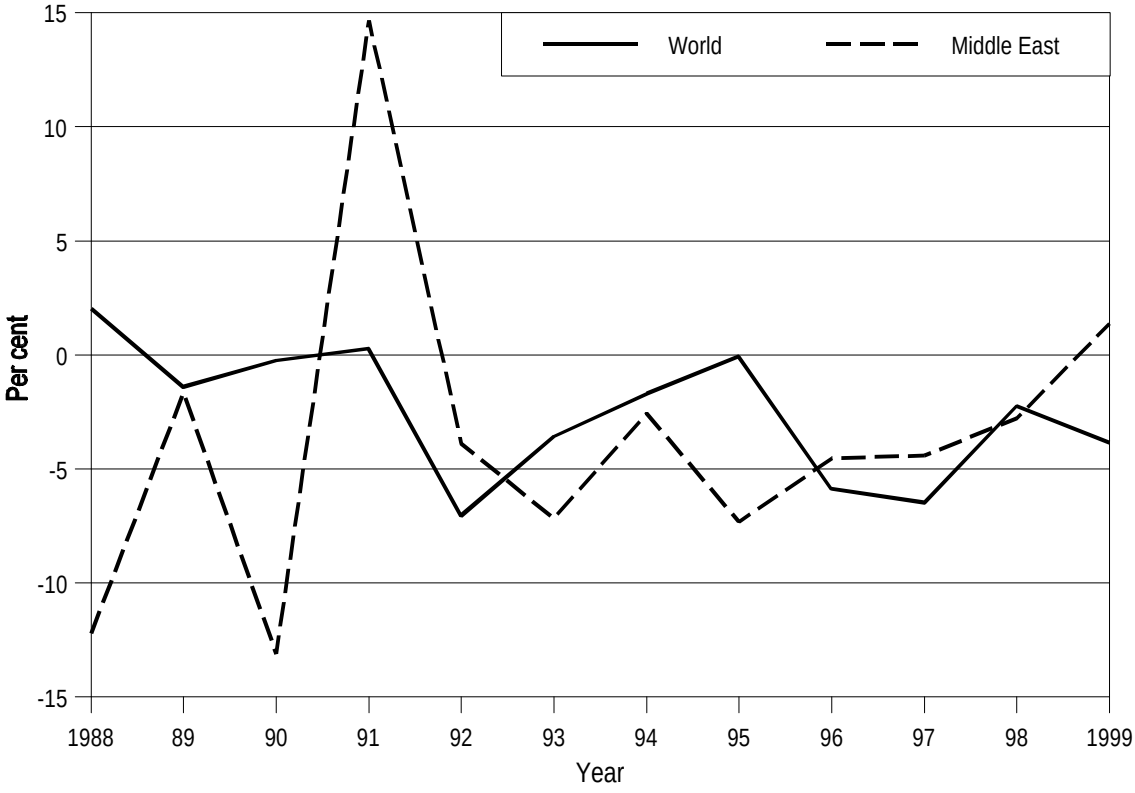
Figure 6-13. Annual change in real GDP and GDP per capita — Middle East (1988-2002)





Note. — 1999 Figures are from estimated data.
Source: ICAO Air Transport Reporting Form EF-1.

Figure 6-14. Scheduled airline operating revenues and expenses — Middle East (1988-1999)



Notes. — *1999 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 (1988-1999)

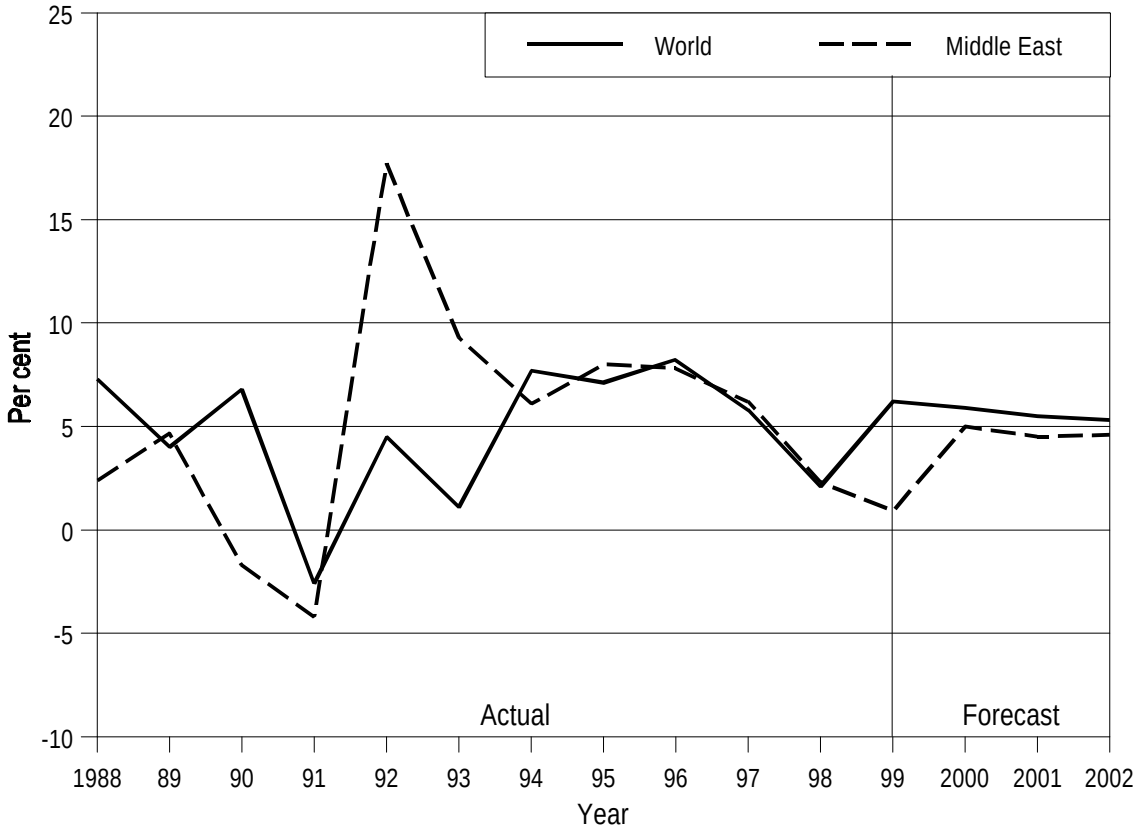
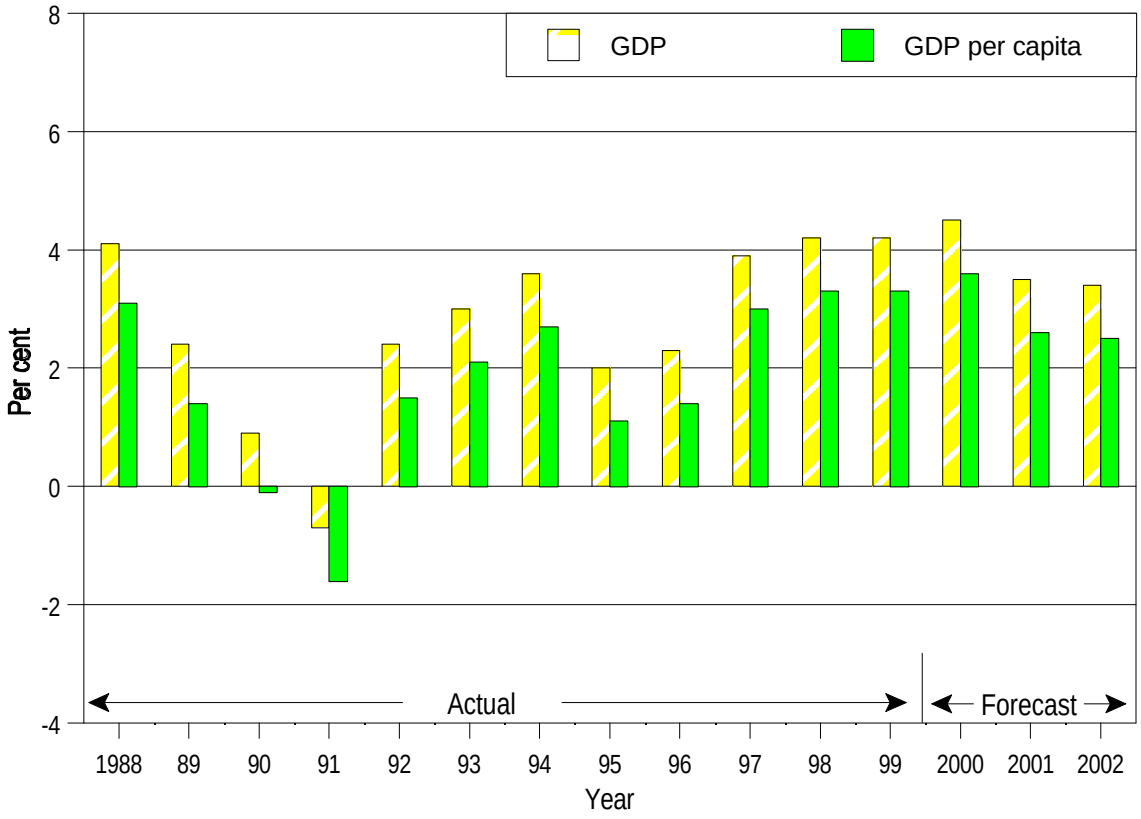
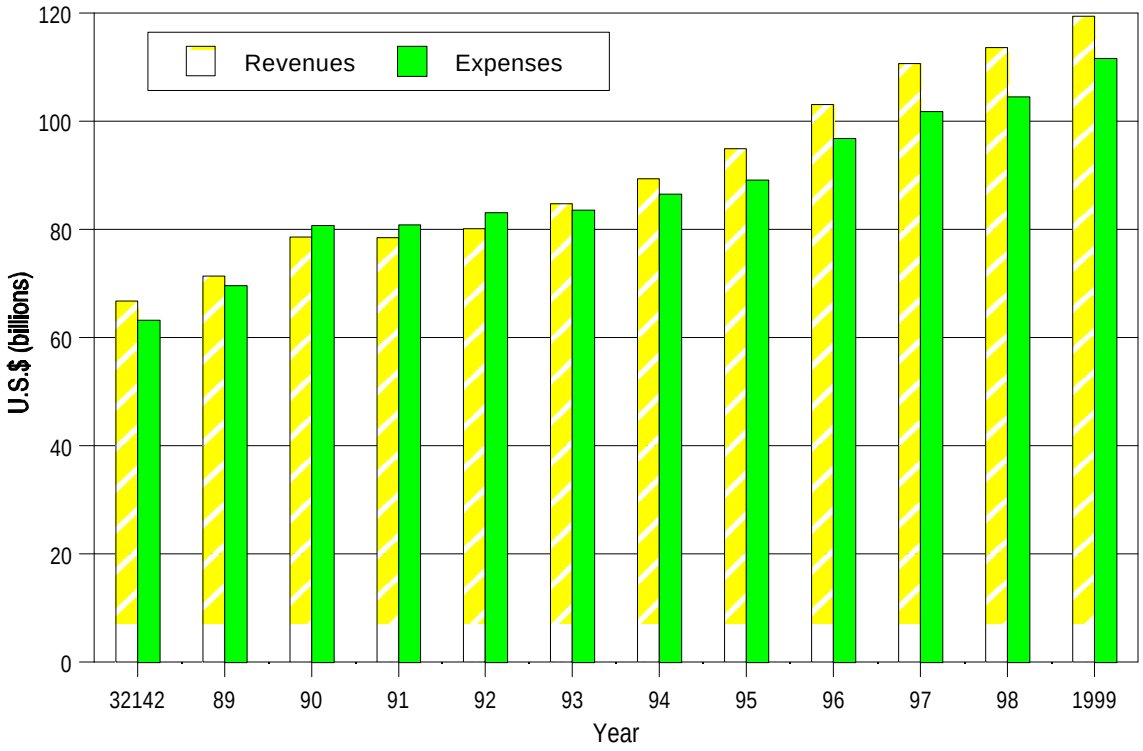


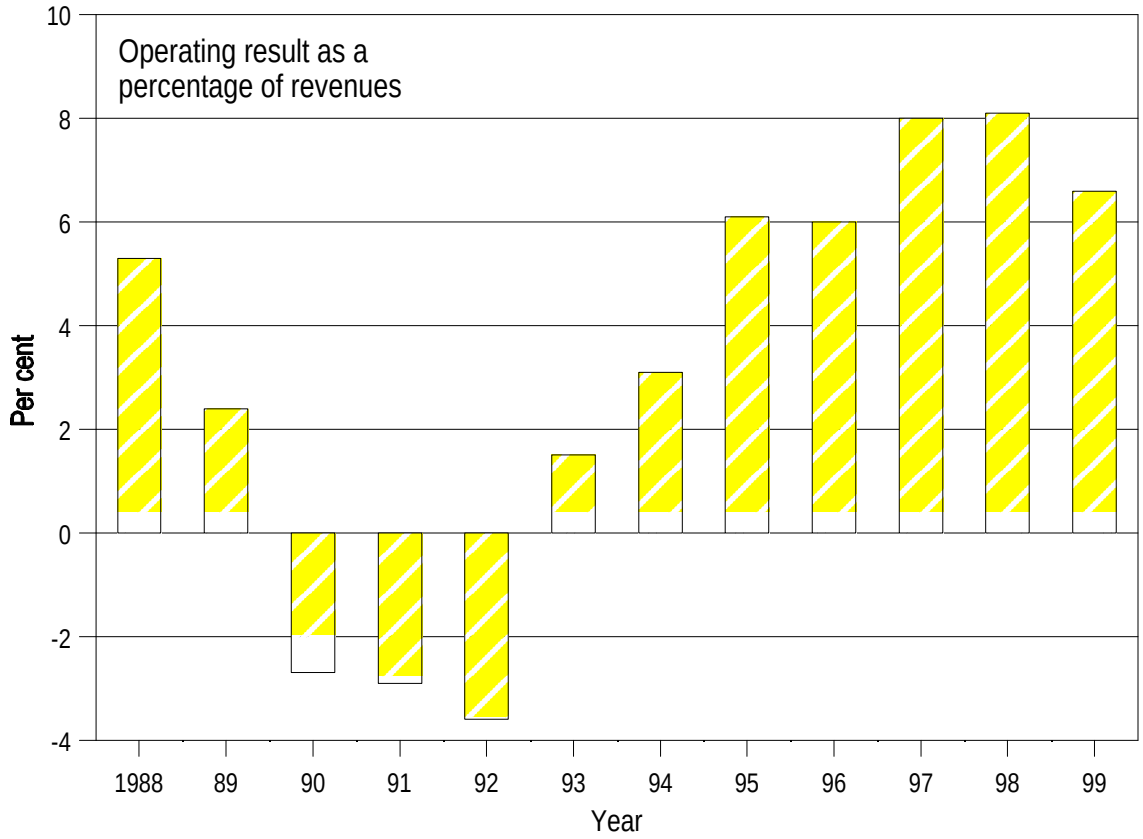
Figure 6-16. Scheduled passenger traffic growth (PKPs) — Middle East and World (1988-2002)



Source: IMF, WEFA Group.

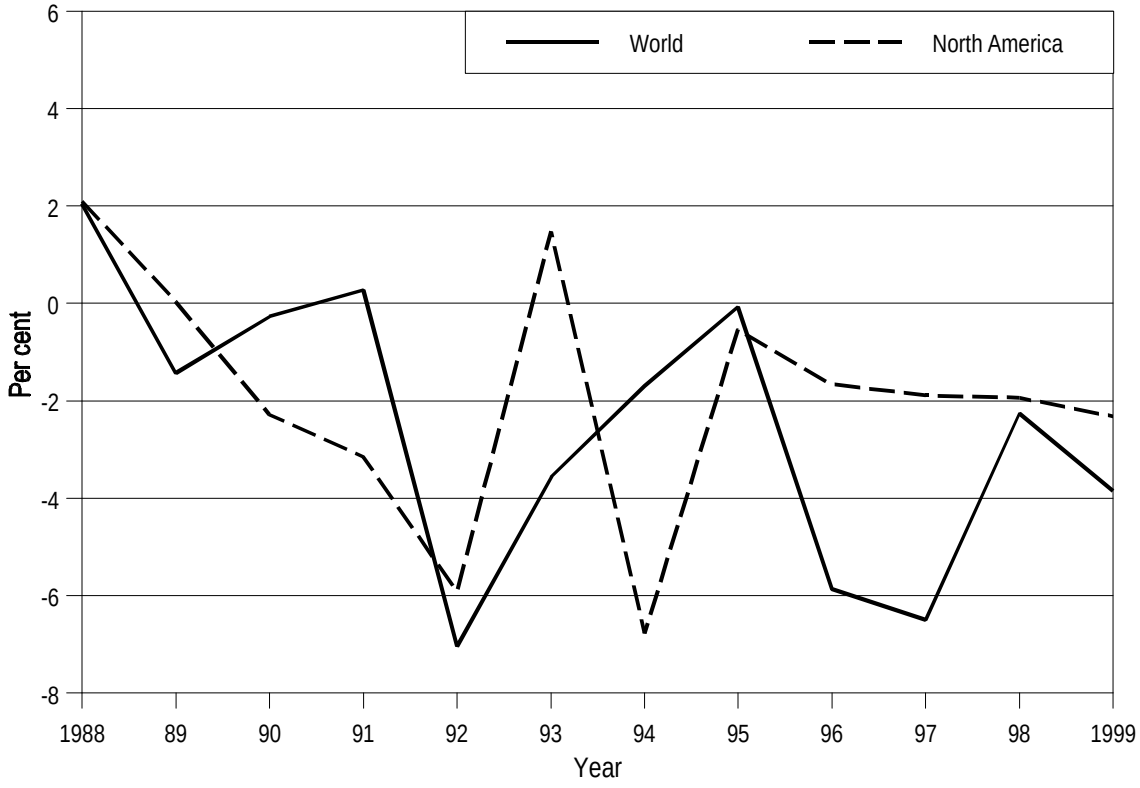
Figure 6-17. Annual change in real GDP and GDP per capita — North America (1988-2002)





Note. — 1999 Figures are from estimated data.
Source: ICAO Air Transport Reporting Form EF-1.

Figure 6-18. Scheduled airline operating revenues and expenses — North America (1988-1999)



Notes. — *1999 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 (1988-1999)

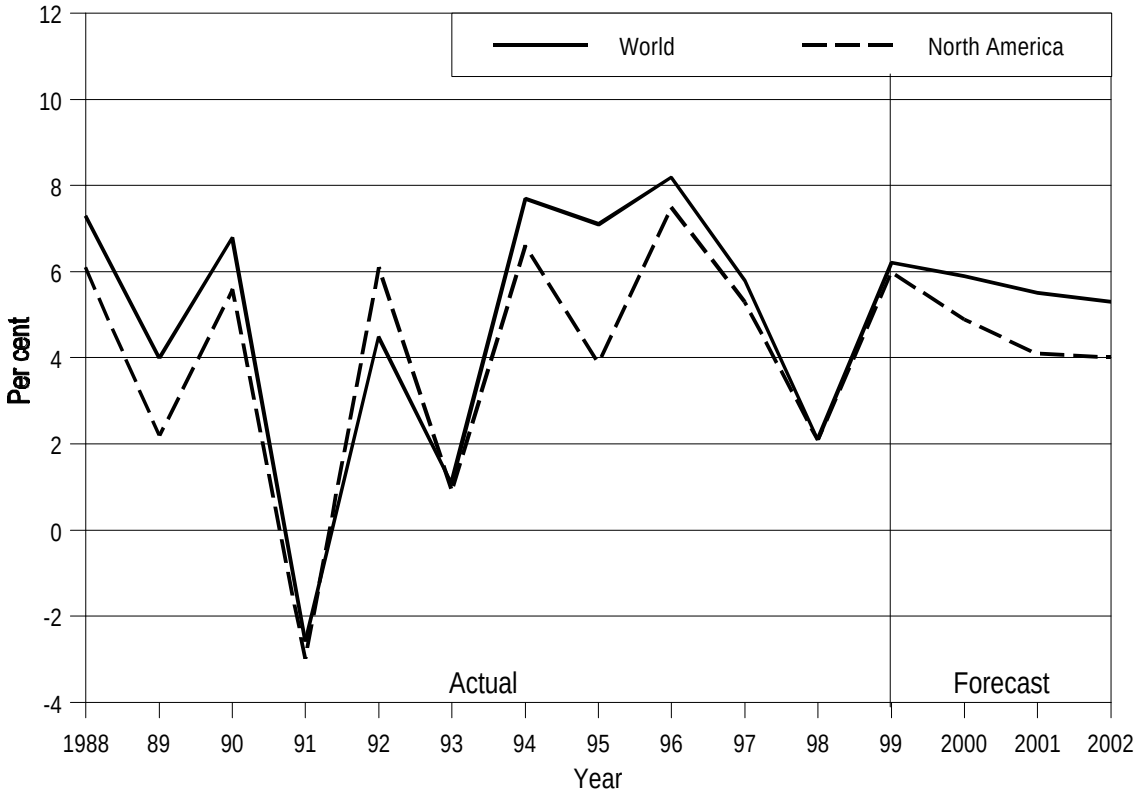
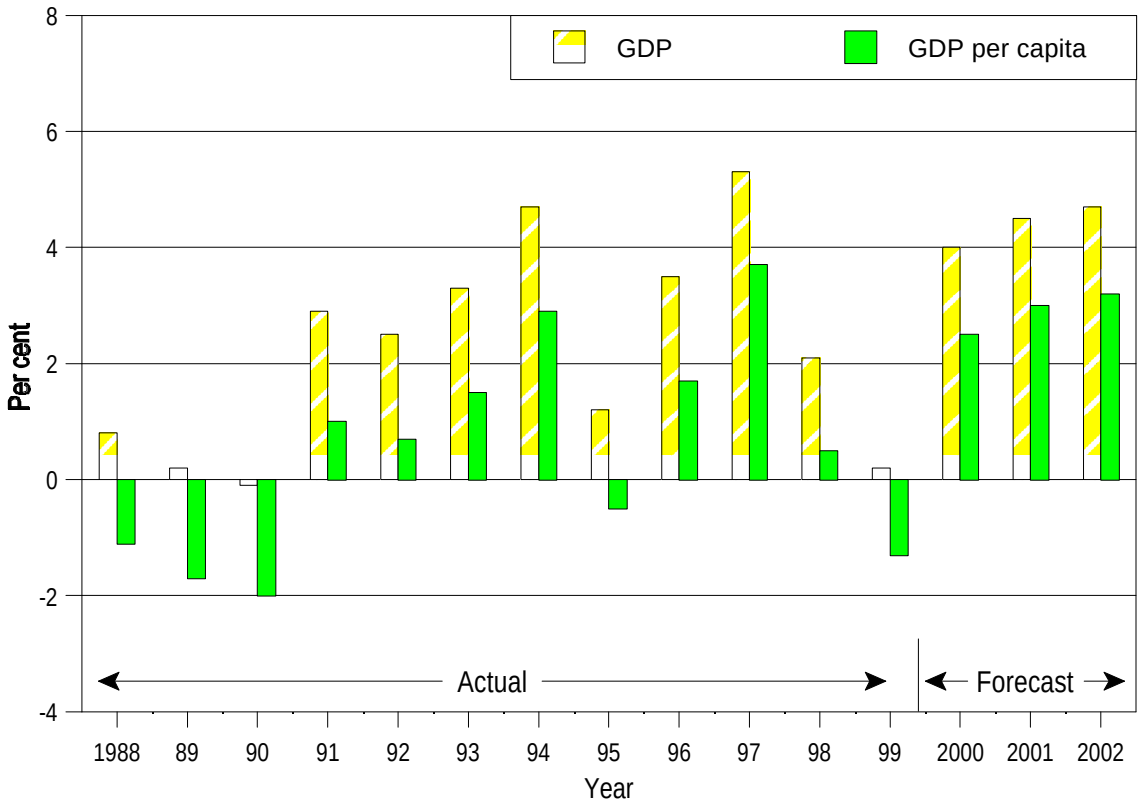
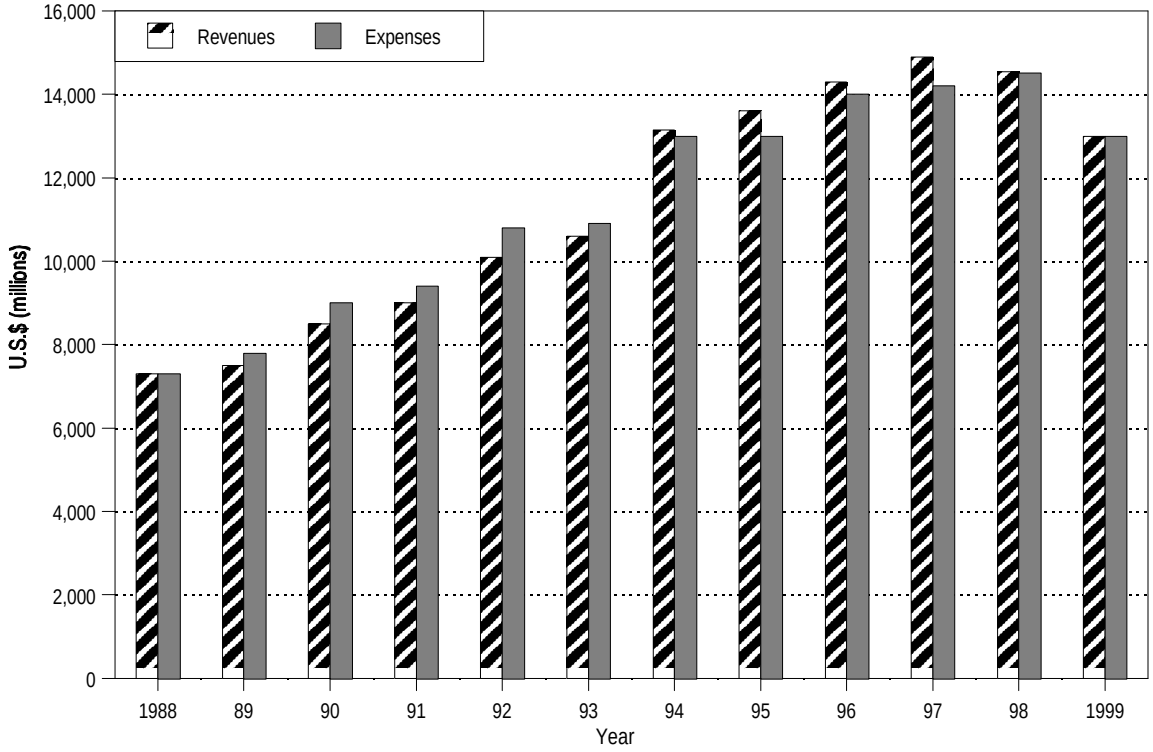


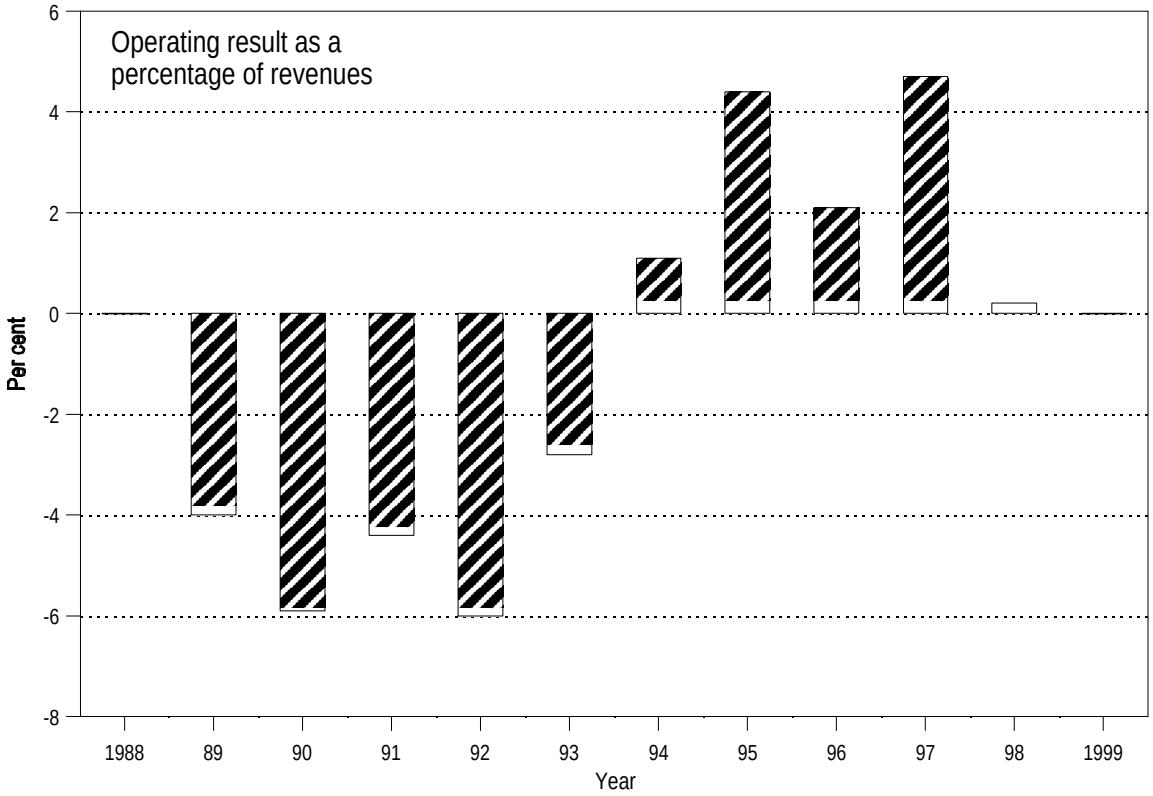
Figure 6-20. Scheduled passenger traffic growth (PKPs) — North America and World (1988-2002)



Source: IMF, WEFA Group.

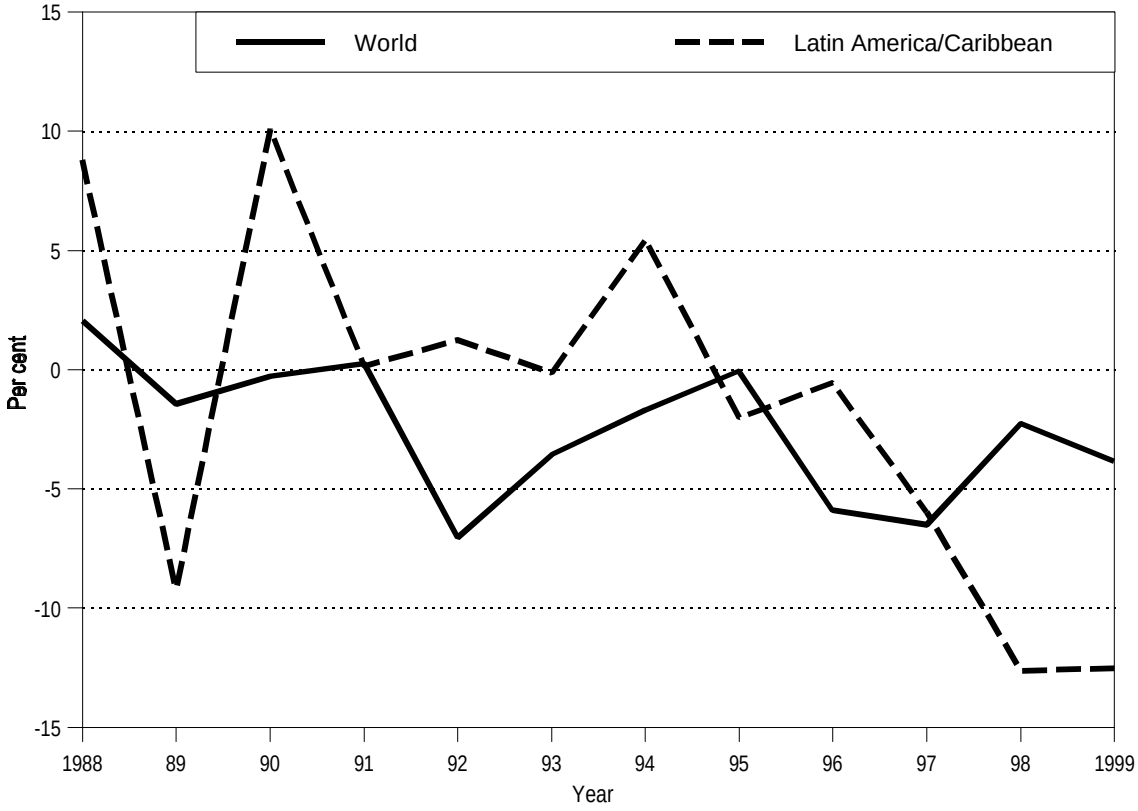
Figure 6-21. Annual change in real GDP and GDP per capita — Latin America and the Caribbean (1988-2002)





Note. — 1999 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 (1988-1999)



Notes. — *1999 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 (1988-1999)

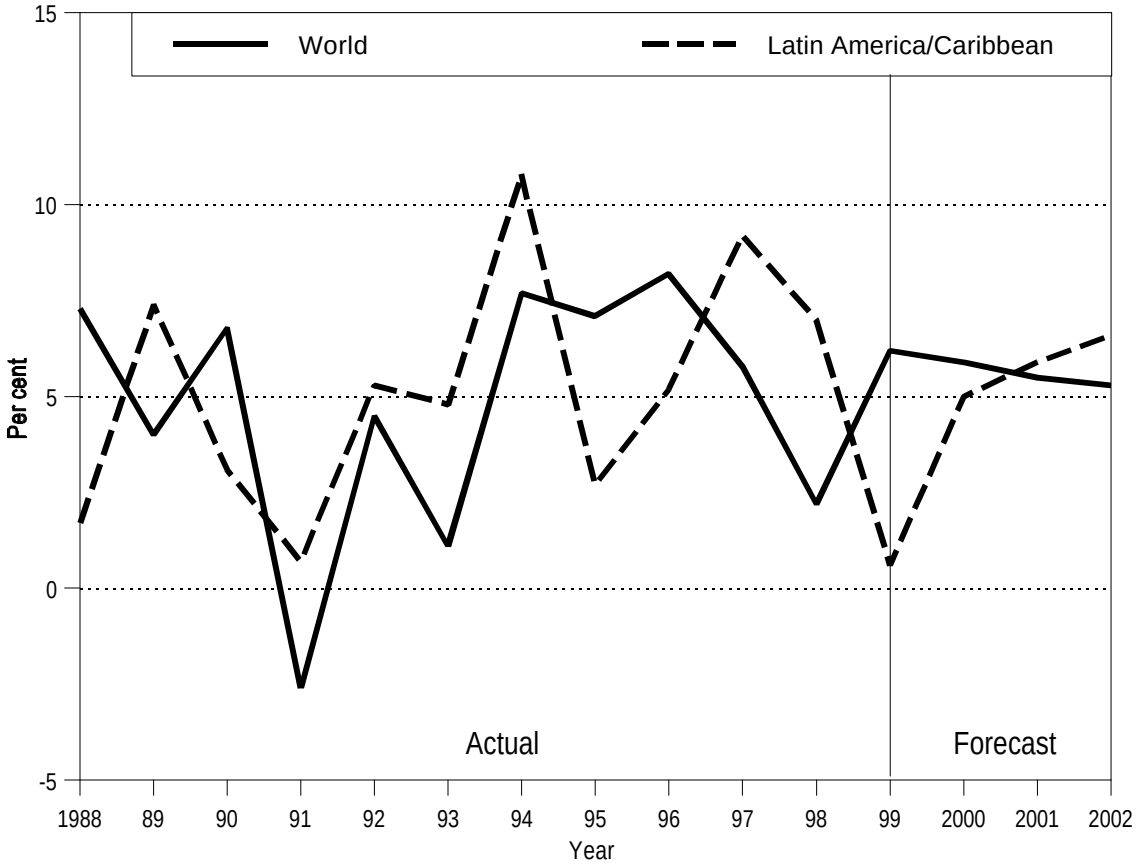


Figure 6-24. Scheduled passenger traffic growth (PKPs) — Latin America and World (1988-2002)

APPENDICES

Appendix 1

Statistical Tables

Table A1-1. Regional distribution of scheduled traffic — 1999

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	6 260	5 820	395 380	742 970	70	31 190	102 370	158 670	65
Percentage of world traffic	26.5	28.2	25.4	26.6		28.9	27.8	25.9	
Africa	570	490	30 450	60 920	61	1 970	7 550	15 800	48
Percentage of world traffic	2.4	2.4	2.0	2.2		1.8	2.0	2.6	
Middle East	560	370	39 230	79 070	67	4 070	11 470	19 790	58
Percentage of world traffic	2.4	1.8	2.5	2.8		3.8	3.1	3.2	
Asia and Pacific	4 220	3 180	340 590	665 510	69	37 560	98 140	158 560	62
Percentage of world traffic	17.8	15.4	21.9	23.9		34.8	26.6	25.9	
North America	10 360	8 780	656 250	1 104 880	71	29 030	132 710	228 460	58
Percentage of world traffic	43.8	42.5	42.1	39.6		26.9	36.0	37.3	
Latin America and Caribbean	1 690	2 030	95 630	134 530	60	4 220	16 560	30 670	54
Percentage of world traffic	7.1	9.8	6.1	4.8		3.9	4.5	5.0	
Total	**23 660**	**20 670**	**1 557 530**	**2 787 880**	**69**	**108 040**	**368 800**	**611 950**	**60**
International services of airlines of ICAO contracting States									
Europe	4 810	3 230	236 730	622 790	70	30 430	90 680	138 710	65
Percentage of world traffic	43.2	57.6	48.4	38.6		32.8	36.8	35.5	
Africa	450	230	17 480	52 550	60	1 910	6 740	14 110	48
Percentage of world traffic	4.0	4.1	3.6	3.3		2.1	2.7	3.6	
Middle East	450	200	22 790	67 670	67	3 970	10 340	17 660	59
Percentage of world traffic	4.0	3.6	4.7	4.2		4.3	4.2	4.5	
Asia and Pacific	2 380	650	106 810	462 280	71	34 550	78 500	118 850	66
Percentage of world traffic	21.4	11.6	21.8	28.6		37.3	31.9	30.4	
North America	2 230	790	75 520	327 740	74	18 320	48 830	82 310	59
Percentage of world traffic	20.0	14.1	15.4	20.3		19.8	19.8	21.0	
Latin America and Caribbean	810	510	29 560	80 960	63	3 500	11 140	19 560	57
Percentage of world traffic	7.3	9.1	6.0	5.0		3.8	4.5	5.0	
Total	**11 130**	**5 610**	**488 890**	**1 613 990**	**70**	**92 680**	**246 230**	**391 200**	**63**

Table A1-2. Number of turbo-jet and turbo-prop aircraft delivered, ordered and remaining to be delivered up 31 December 1999[1]
(excludes military and government operated aircraft)

Type of Aircraft	Before 1999	Delivered during 1999	Total as of 31/12/99	Ordered during 1999[2]	Remaining to be delivered as of 31/12/99[3]
Turbo-jets					
Airbus Industrie A-300	478	8	486	0	30
Airbus Industrie A-310	252	0	252	0	6
Airbus Industrie A-319	117	86	203	54	388
Airbus Industrie A-320	691	98	789	177	472
Airbus Industrie A-321	111	33	144	42	131
Airbus Industrie A-330	87	44	131	36	133
Airbus Industrie A-340	145	18	163	38	123
Boeing 717		12	12	15	117
Boeing 737	3,221	296	3,517	213	847
Boeing 747	1,174	47	1,221	26	74
Boeing 757	830	67	897	7	69
Boeing 767	727	44	771	21	103
Boeing 777	178	83	261	27	199
British Aerospace - 146/RJ 85/100	330	24	354	8	9
Canadair Regional Jet	267	73	340	166	355
Dornier DO-328 Jet		15	15	54	80
Embraer EMB -145	94	79	173	102	163
Douglas MD-80/90	1,262	39	1,301	0	2
Douglas MD-11	184	8	192	1	5
Total of aircraft in production	10,148	1,074	11,222	987	3,306
Total of aircraft not in production [4]	6,286		6,286		
Total turbo-jets	16,434	1,074	17,508	987	3,306
Turbo-Props					
Aerospatiale/Aeritalia ATR-42/72	556	32	588	26	0
DeHavilland Canada DHC-8	511	25	536	57	76
Dornier DO-328	90	8	98	3	4
Embraer EMB-120 Brasilia	343	7	350	0	0
SAAB SF-340	445	3	448	0	0
SAAB 2000	56	4	60	0	0
Total of aircraft in production	2,001	79	2,080	86	80
Total of aircraft not in production[4]	2,922		2,922		
Total turbo-props	4,923	79	5,002	86	80

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 1998.

Table A1-3. Aircraft accidents involving passenger fatalities on scheduled air services, 1980 — 1999

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.								
1980	21	734	0.08	0.13	0.23	0.38	0.14	0.20
1981	22	365	0.04	0.06	0.25	0.40	0.15	0.22
1982	25	762	0.08	0.13	0.28	0.46	0.18	0.25
1983	21	817	0.08	0.13	0.23	0.37	0.14	0.20
1984	16	218	0.02	0.03	0.16	0.26	0.10	0.14
1985	25	1037	0.09	0.14	0.24	0.39	0.15	0.21
1986	19	427	0.03	0.05	0.17	0.27	0.10	0.15
1987	23	889	0.06	0.10	0.19	0.31	0.12	0.18
1988	26	712	0.05	0.08	0.21	0.33	0.13	0.19
1989	29	879	0.06	0.09	0.22	0.36	0.13	0.21
1990	23	473	0.03	0.05	0.17	0.27	0.10	0.16
1991	24	518	0.03	0.05	0.17	0.28	0.11	0.17
1992	24	978	0.05	0.09	0.16	0.26	0.10	0.17
1993	31	806	0.04	0.07	0.20	0.32	0.13	0.21
1994	23	962	0.05	0.08	0.14	0.22	0.09	0.14
1995	20	541	0.02	0.04	0.11	0.18	0.07	0.12
1996	21	1125	0.05	0.08	0.11	0.18	0.07	0.12
1997	25	867	0.03	0.05	0.12	0.20	0.08	0.13
1998	20	904	0.03	0.06	0.10	0.15	0.06	0.11
1999	19	487	0.02	0.03	0.09	0.14	0.05	0.10
Including the USSR up to 1992 and the Commonwealth of Independent States thereafter.								
1986	24	641	0.04	0.07	na	na	na	na
1987	25	900	0.06	0.09	na	na	na	na
1988	29	742	0.04	0.07	na	na	na	na
1989	29	879	0.05	0.08	na	na	na	na
1990	27	544	0.03	0.05	na	na	na	na
1991	29	638	0.03	0.06	na	na	na	na
1992	28	1076	0.06	0.09	na	na	na	na
1993	33	864	0.04	0.07	0.20	0.32	0.12	0.21
1994	27	1171	0.06	0.09	0.15	0.25	0.10	0.16
1995	25	711	0.03	0.05	0.13	0.21	0.08	0.14
1996	24	1146	0.05	0.07	0.12	0.19	0.08	0.13
1997	26	929	0.04	0.06	0.12	0.20	0.08	0.14
1998	20	904	0.03	0.05	0.09	0.15	0.06	0.10
1999	20	489	0.02	0.03	0.09	0.14	0.05	0.10

na = not available

Source: ADREP and other reports.

Table A1-4 Aviation security, 1980 - 1999

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
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	15	2	10	0	3	54	130
1997	6	1	4	0	1	0	1
1998	9	1	6	0	2	1	0
1999	6	0	6	0	0	2	2

*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 2000, 2001 and 2002 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 = 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 $ln\ y = a + b_1 ln x_1 + b_2 ln x_2$. Annual data covering a period of 40 years were used in the subsequent econometric (least squares regression) analysis, with the following results at the global level.

$$\ln PKP = 0.017 + 2.19 \ln GDP - 0.50 \ln PYIELD \qquad R^2 = 0.999$$
$$\qquad\qquad (31.8) \qquad\qquad (-6.5) \qquad S.E. = .027$$

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

— END —