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REGIONAL DIFFERENCES IN FARES, RATES AND COSTS FOR INTERNATIONAL AIR TRANSPORT 1989

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1. INTRODUCTION

1. This study has been prepared pursuant to ICAO Assembly Resolution A21-26 [Clauses 1b) and d)], which directs the Council to undertake analyses of regional differences in the level of international passenger fares and corresponding differences in the level of airline costs. Covering the year 1989, this study is the fifteenth in an annual series, the one for the year 1988 having been published as Circular 228.

2. For 17 international route groups, comprising all international routes, passenger, freight and mail revenue yield data are presented in Chapter 2 for scheduled services along with passenger and freight revenue yield data for non-scheduled operations. For the same route groups regional differences in the costs related to the scheduled service passenger yields are presented in Chapter 3. Finally, certain of the causes of regional differences in costs are identified in Chapter 4.

3. The sources of data used in the study are given in Appendix 1 together with information on the sample sizes on which revenue and cost data are based. The method of analysis used in the study is presented in Appendix 2 together with information on the margins of uncertainty which should be borne in mind when considering the results of studies of this kind.

4. Overviews of published passenger fares and freight rates are available in separate annual publications issued by the Organization in response to Clause 1a) of Assembly Resolution A21-26. Circular 224 covers September 1989 and Circular 231 covers September 1990.

5. Unless indicated otherwise, all references in this Circular to "cents" mean "U.S. cents", and all references to "dollars" mean "U.S. dollars".

2. LEVELS OF FARES AND RATES

Passenger traffic

1. Estimates of average unit passenger revenues in 1989 by route group are presented in Table 2-1.
2. The first column of data in Table 2-1 shows the average revenue per passenger-kilometre for scheduled passenger traffic on each route group. The data are presented without distinction among class of travel or among fare type. Thus they represent the over-all weighted average for all individual routes on all route groups and for all the fares that apply. The over-all average revenue per passenger-kilometre was estimated at 8.23 cents for 1989, but the route group averages vary from a high of 17.7 cents in local Europe to a low of 5.5 cents on routes across the South Pacific.
3. The second column of data shows the average revenue per passenger-kilometre for non-scheduled passenger traffic recorded for each route group. The figures here range from a high of 16.4 cents in local Middle East to a low of 4.1 cents on routes between Canada, Mexico and the United States, and across the North Atlantic. On some route groups, notably those where the revenue yield is comparable to or above that from scheduled services, the non-scheduled traffic concerned is of a very limited volume and highly specific nature, carried on an ad hoc basis at a relatively high cost (e.g. in local South America and local Middle East), while on other route groups the traffic is of greater volume and carried on a more regular basis at a lower cost (e.g. in local Europe). The third and fourth data columns of Table 2-1 show the reported non-scheduled revenue per passenger-kilometre for traffic carried by scheduled airlines and for traffic carried by non-scheduled operators; there are in some cases significant differences between the two figures in the same route group.
4. The final four columns of Table 2-1 show unit revenues for scheduled services and non-scheduled flights in terms of the average revenue per seat-kilometre. The effect of the higher load factors generally achieved by non-scheduled flights compared with scheduled services is brought out by this presentation. However, in a few cases, such as for routes in local Asia/Pacific and between Europe/Middle East/Africa and Asia/Pacific, the average passenger load factor achieved on scheduled services is so high (over 70 per cent) that it matches or exceeds the load factor reported for non-scheduled services. The per seat-kilometre revenues for non-scheduled operations are in most cases much closer to the revenues for scheduled services than the comparable per passenger-kilometre revenues.
5. On a world-wide basis the estimated average revenue per passenger-kilometre for scheduled services (excluding incidental revenues) at 8.23 cents in 1989 showed an increase of about 1 per cent over the 8.17 cents recorded for 1988. Among the individual route groups, of the 16 route groups for which comparable data are available eight showed little or no change in revenue yield

**Table 2-1. Estimated average unit passenger revenues
by international route group¹, 1989**

Route group ²	Revenue (cents) per passenger-kilometre				Revenue (cents) per seat-kilometre			
	Scheduled services ³	Non-scheduled flights			Scheduled services ³	Non-scheduled flights		
		All categories	By international scheduled airlines	By other carriers		All categories	By international scheduled airlines	By other carriers
1. Between North America and Central America/Caribbean	7.4	4.3	4.3	-	4.8	3.5	3.5	-
2. Between and within Central America and Caribbean	-	-	-	-	-	-	-	-
3. Between Canada, Mexico and the United States	7.6	4.1	4.1	-	4.6	3.2	3.2	-
4. Between North America/Central America/Caribbean and South America	7.8	5.2	5.2	-	4.9	3.7	3.7	-
5. Local South America	9.5	14.1	14.1	-	5.7	9.4	9.4	-
6. Local Europe	17.7	4.9	4.9	4.9	11.1	4.1	4.3	4.1
7. Local Middle East	13.0	16.4	16.4	-	7.5	7.4	7.4	-
8. Local Africa	11.5	11.3	11.3	-	6.8	5.4	5.4	-
9. Between Europe and Middle East	8.9	7.7	7.7	-	5.4	4.8	4.8	-
10. Between Europe/Middle East and Africa	8.6	5.2	3.4	6.0	5.5	4.0	2.3	5.0
11. North Atlantic	6.2	4.1	4.1	4.1	4.2	3.3	3.2	3.4
12. Mid Atlantic	6.4	4.5	6.2	4.5	4.4	3.6	4.1	3.6
13. South Atlantic	7.9	-	-	-	5.5	-	-	-
14. Local Asia/Pacific	8.9	9.1	9.1	-	6.3	5.5	5.5	-
15. Between Europe/Middle East/Africa and Asia/Pacific	6.9	7.0	10.2	3.7	4.9	5.1	6.8	3.0
16. North and Mid Pacific	7.0	5.3	5.3	-	5.1	4.6	4.6	-
17. South Pacific	5.5	-	-	-	3.8	-	-	-

1. Data for scheduled services, where presented, are considered representative for all airlines operating in the route group concerned. Data for non-scheduled flights represent only carriers for which substantive information was available, and are only presented where they include two or more carriers. The representative nature of the data for both scheduled services and non-scheduled flights is described in Appendix 1 and the margins of uncertainty to be taken into account regarding the scheduled service data are discussed in Appendix 2.

2. More detailed definition of the route groups may be found in Appendix 3 on the reverse of the revenue questionnaire.

3. These figures do not generally include such incidental operating revenues as may be attributed to international passenger traffic. On individual route groups incidental operating revenues not included may represent up to an additional 3 per cent over the average revenue quoted.

from 1988, five showed increases and the remaining three showed a decrease. Showing significant increases were routes between Canada, Mexico and the United States (from 6.8 to 7.6 cents), in South America (from 9.3 to 9.5 cents), across the Mid Atlantic (from 6.2 to 6.4 cents), and across the North and Mid Pacific (from 6.7 to 7.0 cents). Significant decreases were shown on routes in local Europe (from 18.4 to 17.7 cents), between Europe and the Middle East (from 8.9 to 8.6 cents), and between Europe/Middle East and Africa (from 8.9 to 8.6 cents). The decreases or small changes in revenue yields shown for routes involving Europe, the Middle East and Africa in part reflect the strengthening of the U.S. dollar against most of the national currencies in those areas. Hence the relative change between 1988 and 1989 would in many cases be significantly different if expressed in the national currencies of the airlines concerned. A brief evaluation of this effect is given in Chapter 3, paragraphs 10 and 11.

6. The analyses above relate only to the average unit revenues for all airlines combined on each route group. There can be wide variations around these averages shown amongst individual airlines. In the case of scheduled services the variation amongst airlines of the revenue per passenger-kilometre for each route group is shown in Table 2-2. For a few route groups the unit revenues for individual airlines do not vary very much from the route group average (for example for routes across the North Atlantic). However, on most route groups the unit revenues differ significantly amongst airlines, reflecting differing route structures and traffic mix amongst other factors.

Freight and mail traffic

7. Average reported unit freight and mail revenues in 1989 by international route group are presented in Table 2-3.

8. The first column of data in Table 2-3 shows the average revenue per tonne-kilometre performed for all scheduled freight traffic on each route group whether carried on passenger, combination or all-freight aircraft. The variation among route group averages is even more marked than in the case of scheduled passenger traffic, ranging from a high of 72.0 cents in local Europe to a low of 20.2 cents on routes across the North Atlantic. Comparing with data for the previous year, six route groups out of the 17 showed some increase while the remaining 11 route groups showed a decrease. The largest increases were for routes between North America and Central America/Caribbean (from 33.8 to 38.7 cents), and for routes between and within Central America and the Caribbean (from 45.0 to 54.1 cents). The largest decreases in revenue yield were recorded for routes in local South America (from 44.0 to 36.0 cents), local Europe (from 81.5 to 72.0 cents), in local Africa (from 57.4 to 51.2 cents), between Europe and the Middle East (from 34.0 to 31.7 cents), in local Asia/Pacific (from 36.9 to 33.6 cents), and across the South Pacific (from 23.8 to 20.9 cents). The relatively large change in revenue yield on routes between and within Central America and the Caribbean, and in local South America should be considered in the context of the lower representation of airlines from these areas in 1988 (only two airlines compared with three in 1989 for Central America and the Caribbean and seven airlines compared with twelve in 1989 for local South America).

Table 2-2. Variation in scheduled passenger revenue yield among airlines, 1989

Route group (short title)	Average revenue (cents) per passenger-kilometre (all airlines from Table 2-1)	Number of airlines in this analysis	Revenue (cents) per passenger-kilometre for individual airlines																					
			3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	12 to 13	13 to 14	14 to 15	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	20 to 21	21 to 22	22 to 23	23 and over	
			Number of airlines																					
1. North-Central America	7.4	11			2	1	4	2	0	2														
2. Central America	-	4				1	1	0	1	0	0	0	0	0	1									
3. North America	7.6	13		1	0	4	4	2	1	1														
4. North-South America	7.8	18		1	0	3	4	5	1	3	0	0	0	1										
5. South America	9.5	10						2	5	1	0	2												
6. Europe	17.7	25						2	4	2	0	3	0	1	0	0	0	4	3	1	2	2	1 ¹	
7. Middle East	13.0	6								1	1	1	2	1										
8. Africa	11.5	11							2	0	4	3	1	1										
9. Europe-Middle East	8.9	26				4	4	8	3	3	1	2	0	1										
10. Europe-Africa	8.6	30			2	4	3	5	4	2	5	2	0	1	0	0	0	0	0	0	0	0	1	1 ²
11. North Atlantic	6.2	38	1	5	16	11	3	2																
12. Mid Atlantic	6.4	12	1	0	2	5	3	1																
13. South Atlantic	7.9	15			1	6	3	3	2															
14. Asia/Pacific	8.9	19			3	2	3	6	3	1	0	0	0	0	0	1								
15. Europe-Asia/Pacific	6.9	40	1	6	10	7	7	7	0	2														
16. North/Mid Pacific	7.0	14		4	2	2	3	2	1															
17. South Pacific	5.5	9	1	1	3	3	0	0	0	0	0	1												

1. In the range of 24-25 (1).
 2. In the range of 33-34 (1).

Table 2-3. Estimated average unit freight and mail revenues by international route group, 1989¹

Route group (short title)	Freight revenue (cents) per tonne-kilometre performed				Mail revenue (cents) per tonne-kilometre performed — scheduled services
	Over-all	Scheduled services			
		Passenger and combination aircraft	All-freight aircraft	Non-scheduled flights	
1. North-Central America	38.7	41.3	28.2	-	38.4
2. Central America	54.1	56.1	48.7	-	49.8
3. North America	33.8	34.4	21.2	-	36.0
4. North-South America	32.0	30.5	33.5	29.8	42.0
5. South America	36.6	41.5	28.9	-	55.0
6. Europe	72.0	72.3	70.6	38.8	68.5
7. Middle East	36.5	36.6	32.0	-	50.0
8. Africa	51.2	51.4	47.2	-	58.9
9. Europe-Middle East	31.7	33.2	26.3	36.8	55.9
10. Europe-Africa	35.3	36.4	32.6	50.7	55.6
11. North Atlantic	20.2	20.4	19.7	16.9	34.1
12. Mid Atlantic	25.5	25.9	22.8	-	54.1
13. South Atlantic	24.7	25.8	21.0	-	59.1
14. Asia/Pacific	33.6	33.7	33.0	27.2	49.8
15. Europe-Asia/Pacific	28.2	27.0	30.4	18.1	43.3
16. North/Mid Pacific	26.9	29.6	25.4	27.2	34.6
17. South Pacific	20.9	21.1	19.7	-	33.8

1. Data represent only carriers for which substantive information was available and are only presented where they include two or more carriers. The representative nature of the data is described in Appendix 1.

9. The second and third columns of data in Table 2-3 show the average revenue per tonne-kilometre performed for scheduled freight traffic carried on passenger or combination aircraft and that obtained for traffic carried on all-freight aircraft. In comparing the two sets of figures it may be seen that the revenue yield from all-freight aircraft is frequently lower than that achieved from passenger and combination aircraft, as the former are more likely to carry large shipments which are subject to quantity discount rates or low specific commodity rates. However, for some route groups where there is large cargo capacity offered at competitive rates on wide-body passenger and combination aircraft (for example on routes across the North Atlantic, in local Asia/Pacific and across the South Pacific), the difference in revenue yield is relatively small.

10. The fourth column of data in Table 2-3 shows the average revenue per tonne-kilometre performed for all non-scheduled freight traffic on each international route group. The unit revenues among route groups range from a high of 50.7 cents on routes between Europe/Middle East and Africa to a low of 16.9 cents on routes across the North Atlantic. The figure for non-scheduled operations is actually higher than that for all-freight scheduled operations for three of the eight comparable route groups. In some cases this reflects the specialized non-scheduled operations of one or two carriers. There were significant changes in average unit revenue between 1988 and 1989 for most of the seven route groups for which there are comparable data. These changes, in general, reflect the volatility in revenue yields for this type of market.

11. The final column of data in Table 2-3 shows the average revenue per tonne-kilometre performed for all mail traffic on each route group (virtually all international mail is carried on scheduled services). The route group averages range from a high of 68.5 cents in local Europe to a low of 33.8 cents on routes across the South Pacific. Between 1988 and 1989, four of the 17 route groups show increases in unit mail revenues. The most significant increases were on routes between North America and Central America/Caribbean (from 35.4 to 38.4 cents), between and within Central America and the Caribbean (from 45.2 to 49.8 cents), and local South America (from 52.1 to 55.0 cents). Decreases were recorded for the remaining 13 route groups. The most significant decreases were recorded on routes between Canada, Mexico and the United States (from 43.1 to 38.0 cents), in local Europe (from 76.9 to 68.5 cents), in local Middle East (from 84.4 to 50.0 cents), between Europe and the Middle East (from 62.9 to 55.9 cents), between Europe/Middle East and Africa (from 60.8 to 55.6 cents), across the Mid Atlantic (from 64.6 to 54.1 cents), in local Asia/Pacific (from 56.9 to 49.8 cents), between Europe/Middle East/Africa and Asia/Pacific (from 48.5 to 43.3 cents), and across the South Pacific (from 44.3 to 33.8 cents). As for freight, the relatively large change in revenue yield on routes involving Central America, the Caribbean and South America should be considered in the context of the lower representation of airlines from these areas in 1988. The relatively large change in revenue yield in local Middle East is in part due to the absence of two major Middle East carriers in the 1989 sample, which may have affected the average revenue yield reported. Unit mail revenues in general remain significantly higher than unit freight revenues on scheduled services except for routes between North America and Central America/Caribbean, where they were about the same in 1989 and for routes between and within Central America and the Caribbean and in local Europe, where unit mail revenues were significantly lower than unit freight revenues on scheduled services.

Table 2-4. Variation in scheduled freight revenue yield among airlines, 1989

Route group (short title)	Average revenue (cents) per tonne-kilometre (all airlines from Table 2-3)	Number of airlines in this analysis	Revenue (cents) per tonne-kilometre for individual airlines																
			0 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	80 to 90	90 to 100	100 to 110	110 to 120	120 to 130	130 to 140	140 to 150	150 to 160	160 and over
			Number of airlines																
1. North-Central America	38.7	8			2	1	3	1	0	1									
2. Central America	54.1	3					1	1	0	0	0	0	1						
3. North America	33.8	13		2	3	4	2	0	2										
4. North-South America	32.0	24		2	8	4	2	3	1	0	1	1	1	0	0	0	0	0	1 ¹
5. South America	36.8	12		1	3	5	0	0	0	0	1	0	2						
6. Europe	72.0	25					1	3	7	4	4	2	0	1	1	0	1	0	1 ²
7. Middle East	36.5	6			2	2	0	0	1	1									
8. Africa	51.2	11		1	1	1	3	1	1	2	1								
9. Europe-Middle East	31.7	24		1	4	7	4	2	3	1	0	0	1	0	0	1			
10. Europe-Africa	35.3	29		1	8	5	8	0	3	1	0	2	0	0	1				
11. North Atlantic	20.2	37		13	21	3													
12. Mid Atlantic	25.5	12		2	8	2													
13. South Atlantic	24.7	15		2	9	2	1	0	0	1									
14. Asia/Pacific	33.6	20		1	5	10	1	0	2	0	0	1							
15. Europe-Asia/Pacific	28.2	42		3	20	10	7	1	1										
16. North/Mid Pacific	26.9	16		2	7	5	1	1											
17. South Pacific	20.9	10		3	4	2	0	1											

1. In the range of 220-240 (1).

2. In the range of 260-270 (1).

12. A notable feature of the mail unit revenue data is that for most of the route groups involving two or more regions there are substantial differences in the yield recorded by the carriers according to the region in which they are based. This distinction is particularly marked for the following route groups and regions: *between North America/Central America/Caribbean and South America*, all airlines 42.0 cents, North American airlines 31.2 cents, South American airlines 59.2 cents; *North Atlantic*, all airlines 34.1 cents, North American airlines 28.3 cents, European airlines 47.9 cents; and *North/Mid Pacific*, all airlines 34.6 cents, North American airlines 26.4 cents, Asian airlines 55.0 cents. These differences are to a large extent a result of comparatively low air mail conveyance rates being set by the United States authorities for originating mail.

13. In the case of unit freight revenues, the variation amongst individual airlines of the revenue per tonne-kilometre for scheduled services for each route group is shown in Table 2-4. For a few route groups the unit revenues for individual airlines do not vary very much from the route group average (for example on routes across the North and Mid Atlantic). However, as for passenger traffic, on most route groups the unit revenues differ significantly amongst airlines.

3. REGIONAL DIFFERENCES IN SCHEDULED PASSENGER FARES AND RELATED COSTS

Over-all financial results by international route group

1. Selected operational data and estimated financial results for the year 1989 are presented in Table 3-1 over-all and by route groups.
2. The first column of data in the table shows that the number of scheduled airlines operating jet services in each route group ranged from a low of 10 on South Pacific routes to a high of 63 serving routes in local Europe and routes between Europe/Middle East/Africa and Asia/Pacific. It should be noted that propeller aircraft operations of these airlines are excluded from the study, as are the operations of some 123 small international airlines which operate propeller-driven aircraft exclusively; together these operations with propeller aircraft represented about 0.7 per cent of world international seat-kilometres in 1989 with their highest representations in any single route group being 24 per cent between and within Central America and the Caribbean, and four per cent in local Africa and in local Europe. Supersonic aircraft operations, which were also excluded, represented slightly more than 0.1 per cent of world operations.
3. The operational data included in data columns 2 to 5 of Table 3-1 all have a significant effect on unit operating costs (see Chapter 4). There are considerable differences among route groups in the volume of traffic, the average length of flight stages, the average number of seats per aircraft and the average passenger load factor.
4. Financial results are presented in columns 6 to 8. When consulting these data it should be borne in mind that the revenue figures do not generally take into account the incidental operating revenues. Those incidental revenues which may be directly attributed to passenger traffic include revenues from passengers paying less than 25 per cent of the normal applicable fare, commissions received on sales of transportation on other carriers, "no-show" and cancellation fees (expenses incurred against these revenue items are included in the cost figures shown in column 7); these incidental revenues also include on a net basis capacity equalization payments arising from pooled and/or joint services as well as from the sale of own capacity to other carriers. Revenues accruing from the provision of services other than for air transportation (such as service and maintenance sales or handling services for third parties) and the corresponding costs are excluded from all figures presented in this study. An analysis of incidental revenue data on this basis for 1989 indicates that for international routes as a whole, relevant incidental revenues not included in Table 3-1 were about 0.09 cents per passenger-kilometre which, if added to the estimated world-wide unit revenue, increases it by some 1 per cent from 8.23 cents to 8.32 cents per passenger-kilometre. For individual route groups, the passenger-related incidental operating revenues may represent up to an additional three per cent over the average revenue quoted.

**Table 3-1. Basic operational data and financial results
for scheduled passenger services by international route group, 1989¹**

Route group ²	Operational data					Financial results ³		
	Number of airlines (1)	Percentage of world's international traffic (available seat-km) (2)	Average length of flight stages (km) (3)	Average number of seats per aircraft ⁴ (4)	Average passenger load factor (%) (5)	Average revenue (cents) per pass-km ⁵ (6)	Average passenger costs (cents) per pass-km (7)	Ratio revenue/costs ^{5,6} (8)
I. All world international routes	222	100.0	1 781	242	68	8.23	8.18	1.01
II. International route groups								
1. Between North America and Central America/Caribbean	29	2.7	1 221	181	65	7.4	8.4	0.90
2. Between and within Central America and the Caribbean	17	0.2	729	147	-	-	-	-
3. Between Canada, Mexico and the United States	17	4.9	1 115	158	61	7.6	8.6	0.90
4. Between North America/Central America/Caribbean and South America	35	2.8	2 086	225	63	7.8	8.3	0.95
5. Local South America	19	0.6	926	154	60	9.5	10.8	0.90
6. Local Europe	63	10.2	843	134	63	17.7	16.7	1.05
7. Local Middle East	19	1.1	901	180	58	13.0	12.1	1.05
8. Local Africa	34	0.5	898	146	58	11.5	12.0	0.95
9. Between Europe and Middle East	44	3.3	2 081	201	61	8.9	9.7	0.90
10. Between Europe/Middle East and Africa	60	4.6	2 864	249	65	8.6	8.5	1.00
11. North Atlantic	52	23.0	4 229	291	69	6.2	6.6	0.95
12. Mid Atlantic	18	2.0	3 956	271	70	6.4	6.8	0.95
13. South Atlantic	20	2.0	3 640	285	69	7.9	7.9	1.00
14. Local Asia/Pacific	45	10.0	1 779	276	71	8.9	7.8	1.15
15. Between Europe/Middle East/Africa and Asia/Pacific	63	17.2	3 797	308	71	6.9	6.7	1.05
16. North and Mid Pacific	19	12.2	5 495	335	73	7.0	6.6	1.05
17. South Pacific	10	2.7	4 945	334	69	5.5	6.1	0.90

1. Excluding operational and financial data attributed to supersonic and propeller-driven aircraft.
2. More detailed definition of the route groups may be found in Appendix 3 on the reverse of the revenue questionnaire.
3. The margins of uncertainty which should be considered in relation to these results are discussed in Appendix 2. For routes between and within Central America and the Caribbean the representation was inadequate to justify separate presentation, but the data have been included in the world averages.
4. As defined by available seat-kilometres divided by aircraft-kilometres flown.
5. These figures do not generally include incidental operating revenues. For all international routes that part of this additional revenue which may be directly attributed to international passenger traffic is about 0.09 cents per passenger-kilometre. On individual route groups it may represent up to an additional 3 per cent over the average revenue quoted.
6. Rounded to nearest twentieth for individual route groups.

5. The average operating cost per passenger-kilometre for all international routes was 8.18 cents (column 7), the figures for individual route groups ranging from a high of 16.7 cents in local Europe to a low of 6.1 cents on routes across the South Pacific. These estimated costs include such items as depreciation and interest charges, and sales commission paid, but exclude costs attributable to the carriage of freight and mail.
6. The ratio of passenger revenues to passenger costs (column 8) for international routes as a whole is estimated at 1.01 for the calendar year 1989, varying between individual route groups from 0.90 to 1.15. Taking into account relevant incidental revenues associated with international passenger traffic and margins of uncertainty in estimated revenues and costs (discussed in Appendix 2), the revenue/cost ratio for all international passenger traffic in 1989 is assessed as lying between 0.99 and 1.05, with a most likely value of 1.02.
7. Components of the total passenger costs are presented in Table 3-2. The primary breakdown is between "aircraft" operating costs, being those directly attributable to the operation of aircraft on each route group, and "other" operating costs. All the itemized data carry relatively wide margins of uncertainty and should be regarded as indicative only. Nevertheless, it appears that most of the individual items vary significantly among route groups.

Comparison of results for 1989 with those for 1988

8. An over-all comparison between data for 1989 and corresponding data for 1988 shows an increase of about four per cent in the estimated passenger cost per available seat-kilometre, from 5.36 to 5.56 cents. Since the world-wide average load factor remained in the order of 68 per cent, the cost per passenger-kilometre shows an increase of just over three per cent, from 7.91 to 8.18 cents. Unit revenues (excluding incidental operating revenues) on the other hand showed an increase of about almost 1 per cent, from 8.17 cents per passenger-kilometre to 8.23 cents in 1989 and as a result the over-all revenue/cost ratio shows a small decrease between the two years, from 1.03 in 1988 to 1.01 in 1989.
9. As far as the individual route groups are concerned, the year-to-year cost changes show wide variations which are accentuated by differences in trends in load factors. Between 1988 and 1989, nine out of the 16 route groups for which comparable data are available showed increases in costs per passenger-kilometre, four showed decreases and the remaining three route groups showed little change. The most significant increases were recorded on routes between North America and Central America/Caribbean (from 7.9 to 8.4 cents), between Canada/Mexico and the United States (from 7.2 to 8.6 cents), between North America/Central America/Caribbean and South America (from 7.8 to 8.3 cents), and across the South Pacific (from 5.5 to 6.1 cents). The most significant decreases were recorded on routes in local Middle East (from 12.5 to 12.1 cents) and in local Africa (from 13.4 to 12.0 cents).
10. The comparison of unit costs between 1988 and 1989 reflects a general increase in the price of fuel (see Chapter 4), in particular in the Northern Hemisphere when during the first few months of 1989 fuel prices were substantially above the seasonal prices of previous years, as well as a general

Table 3-2. Estimated passenger costs¹ per passenger-kilometre by cost item, 1989

Route group (short title)	Total operating costs (cf. Table 3-1) (sum of columns 1-9)	Aircraft operating costs		Other operating costs						
		Aircraft operating costs excluding fuel and oil ² (1)	Aircraft fuel and oil (2)	Landing and associated airport charges (3)	En-route facility charges (4)	Station expenses (5)	Passenger services (6)	Commission (7)	Ticketing, sales and promotion (8)	General, administrative and miscellaneous (9)
I. All:										
Cents	8.18	2.32	1.12	0.32	0.17	0.86	1.20	0.79	0.85	0.55
Percentage of total costs	100.0	28.4	13.7	3.9	2.1	10.5	14.6	9.7	10.4	6.7
II. International route groups										
1. North-Central America	8.4	2.6	1.2	0.2	0.1	1.3	1.0	0.8	0.7	0.5
2. Central America	-	-	-	-	-	-	-	-	-	-
3. North America	8.6	2.6	1.2	0.2	0.0	1.4	1.1	1.0	0.8	0.3
4. North-South America	8.3	2.5	1.3	0.2	0.1	0.8	0.9	0.9	0.9	0.7
5. South America	10.8	2.9	1.8	0.5	0.3	1.1	1.2	1.1	1.2	0.7
6. Europe	16.7	4.5	1.4	1.3	0.6	2.7	2.1	1.5	2.0	0.6
7. Middle East	12.1	4.0	1.7	0.5	0.2	1.2	1.3	1.1	1.2	0.9
8. Africa	12.0	3.7	2.2	0.7	0.2	1.2	1.1	1.2	0.8	0.9
9. Europe-Middle East	9.7	3.2	1.2	0.4	0.3	0.9	1.3	0.7	0.9	0.8
10. Europe-Africa	8.5	2.3	1.4	0.3	0.3	0.7	1.3	0.8	0.8	0.6
11. North Atlantic	6.6	1.9	1.0	0.2	0.1	0.7	1.0	0.6	0.6	0.5
12. Mid Atlantic	6.8	1.8	1.2	0.2	0.1	0.5	1.1	0.6	0.7	0.6
13. South Atlantic	7.9	2.0	1.3	0.2	0.2	0.6	1.1	0.8	0.9	0.8
14. Asia/Pacific	7.8	2.4	1.0	0.3	0.1	0.7	1.2	0.8	0.7	0.6
15. Europe-Asia/Pacific	6.7	1.9	1.0	0.2	0.2	0.5	1.0	0.6	0.7	0.6
16. North/Mid Pacific	8.6	1.7	1.0	0.1	0.1	0.4	1.1	0.9	0.9	0.4
17. South Pacific	6.1	1.9	1.0	0.1	0.0	0.5	0.9	0.7	0.6	0.4

1. "Passenger" costs have been derived for each route group taking into account the contribution made by the revenue earned for the carriage of freight and mail on passenger flights towards covering total costs for these flights. Due to the margins of uncertainty in the estimates of individual cost items the figures should be regarded as indicative only.

2. This item includes flights operations expenses (cockpit crew salaries and expenses, rentals and insurance of flight equipment), aircraft maintenance and overhaul, and aircraft standing charges such as depreciation and interest charges.

increase in most of the other costs. However, as with the revenue figures discussed in Chapter 2, the comparison has been in some cases significantly affected by a change in the value of the United States dollar against other world currencies. Within the Americas, where most fares and rates are transacted in United States dollars, the changes in unit revenues generally reflect market changes. Similarly, changes in unit costs in the Americas to a large extent reflect the general increase in costs as well as some operational changes, as the greater part of costs are generally borne in United States dollars.

11. Outside the Americas, for those route groups where the mix of national currencies generally weakened against the United States dollar, the changes shown in revenues and costs are effectively understated, in particular for those route groups involving Europe, the Middle East and Africa. In these areas, local currency data are also sometimes distorted by a relatively large devaluation against the United States dollar of the national currencies of a few countries. Such is the case for routes in local Europe, local Middle East and local Africa where the United States dollar shows an over-all strengthening against related currencies between 1988 and 1989. For these route groups, the increases in costs and revenues when these are expressed in United States dollars are lower (or the decreases are smaller) than those recorded when costs and revenues are expressed in local currencies.

12. Of the 16 route groups for which comparable data are available, only routes in local Africa showed an improvement in the revenue/cost ratio between 1988 and 1989 (from 0.85 to 0.95). The significant improvement in the revenue/cost ratio for the routes in local Africa is due to the combined effects of a decrease in unit costs with a significant increase in passenger load factor (from 54 to 58 per cent).

13. Of the remaining 15 route groups, eight showed no change in the revenue/cost ratio whereas seven showed a decrease. The latter are: between North America and Central America/Caribbean (from 0.95 to 0.90), between Canada/Mexico and the United States (from 0.95 to 0.90), between North America/Central America and South America (from 1.00 to 0.95), local Europe (from 1.10 to 1.05), between Europe and the Middle East (from 0.95 to 0.90), across the North Atlantic (from 1.00 to 0.95) and across the South Pacific (from 1.00 to 0.90). Five of these route groups involve the North American region. Between 1988 and 1989 carriers registered in that region showed a significant increase in unit costs, and, except for routes between Canada, Mexico and the United States, there was little or no change in unit revenues. On routes between Canada, Mexico and the United States, the increase in unit revenues would have been sufficient to cover the increases in unit costs were it not for a significant decrease in passenger load factor (from 65 down to 61 per cent). With regard to routes in local Europe and between Europe and the Middle East, the major factor which contributed to the decrease in the revenue/cost ratio between 1988 and 1989 was the decrease in unit revenues as there was little change in the unit costs and almost no change in passenger load factors.

Variations in revenue/cost ratios amongst airlines

14. The over-all financial results in Table 3-1 show that differences in revenues between route groups broadly reflect differences in costs. However, there are cases where individual airlines earn significant profits on some route

groups while incurring losses on other route groups, and operations of these airlines on the former route groups could therefore be said to have subsidized operations on the latter groups during the period in question. In studies covering previous years, such apparent cross-subsidy between route groups applied not only in the case of individual airlines but carried across to the averages for some regional groups of airlines. Since 1983, however, no such consistent cross-subsidy has been identifiable.

15. Analysis did, however, reveal several route groups within which the results obtained by different regional groups of airlines show significant differences. The figures shown below represent the *unrounded* revenue/cost ratio for each carrier group; however these figures should be used with caution because of the relatively large margin of uncertainty associated with them (see Appendix 2, paragraph 22).

16. Between 1988 and 1989 there was a significant reduction in the revenue/cost ratio of the North American carriers on routes to and from the Caribbean and Latin America mainly due to the poor financial results shown for a major North American carrier operating in those regions. Hence, in 1989 on routes between North America/Central America/Caribbean and South America, the South American airlines as a group showed a revenue/cost ratio of 0.97 (the same as in 1988) which was some 0.06 points higher than the revenue/cost ratio of 0.91 (down from 1.06) achieved by the North American airlines.

17. As in previous years on routes between Europe/Middle East and Africa, European airlines as a group continued to achieve a relatively high revenue/cost ratio (1.08). In contrast, as a group, the African carriers operating on these routes continued to show relatively poor results with a revenue/cost ratio of 0.91. Between 1988 and 1989, there was little change in the revenue/cost ratio achieved by the carriers operating routes between Europe/Middle East/Africa and Asia/Pacific, where the European airlines as a group continued to show a revenue/cost ratio above that of the Asia/Pacific airlines (1.09 against 1.01).

18. Between 1988 and 1989 there was little change on routes across the North and Mid Pacific, where the Asia/Pacific airlines as a group continued to show a revenue/cost ratio below that of the North American airlines (0.98 against 1.14). On routes across the South Pacific there was a general deterioration in the over-all revenue/cost ratio due to a significant increase in costs. In the case of the North American airlines the increase in costs was even more marked due to a relatively large decrease in the contributions made by freight and mail revenues towards reducing passenger costs. Hence, whereas between 1988 and 1989 the Asia/Pacific airlines as a group showed a decrease in revenue/cost ratio from 0.96 to 0.90, the North American airlines as a whole suffered a major reduction from 1.05 in 1988 to 0.89 in 1989.

19. An examination was also carried out as to how the revenue/cost ratios varied amongst individual airlines operating in the same route group. These variations in revenue/cost ratios amongst airlines on a route group can be an important factor in the negotiation of fares for the route group in question, particularly where unanimity or some form of consensus among the airlines is required on proposed fares.

20. The variations in 1989 are shown in Table 3-3. On a few route groups the revenue/cost ratios for the airlines do not vary very much from the route group average (for example in local Europe). However, on most route groups the ratios vary significantly among the airlines and the average revenue/cost ratios do not therefore adequately portray the economics of the operations. On seven route groups the revenue/cost ratios of individual carriers ranged from less than 0.7 to greater than 1.3: on routes between North America and Central America/Caribbean, between North America/Central America/Caribbean and South America, between Europe and the Middle East, between Europe/Middle East and Africa, across the North Atlantic, in local Asia/Pacific, and between Europe/Middle East/Africa and Asia/Pacific.

Table 3-3. Variation of revenue/cost ratios amongst airlines, 1989

Route group (short title)	Average revenue/cost ratio (all airlines, from Table 3-1)	Number of airlines in this analysis	less than 0.7	0.7 to 0.9	0.9 to 1.1	1.1 to 1.3	greater than 1.3
			Number of airlines				
I. All world international routes	1.01	83	4	15	52	7	5
II. International route groups							
1. North-Central America	0.90	10	1	3	4	1	1
2. Central America	-	3		1	1	1	
3. North America	0.90	13	3	6	3	1	
4. North-South America	0.95	16	2	5	6	2	1
5. South America	0.90	9		2	6	1	
6. Europe	1.05	21		3	11	7	
7. Middle East	1.05	6			3	3	
8. Africa	0.95	11		4	2	3	2
9. Europe-Middle East	0.90	24	3	9	11	0	1
10. Europe-Africa	1.00	29	1	7	10	7	4
11. North Atlantic	0.95	35	2	22	7	2	2
12. Mid Atlantic	0.95	12	1	2	8	1	
13. South Atlantic	1.00	14		3	10	1	
14. Asia/Pacific	1.15	18	1	3	6	5	3
15. Europe-Asia/Pacific	1.05	38	1	7	19	7	4
16. North/Mid Pacific	1.05	14		4	4	5	1
17. South Pacific	0.90	8	1	3	4		

4. FACTORS CAUSING REGIONAL DIFFERENCES IN COSTS

1. The financial analysis presented in Chapter 3 included estimates of the average cost per passenger-kilometre performed for each of 16 international route groups. This chapter is concerned with assessments of factors which caused this average cost to vary among the route groups. Some main factors can be identified and their effects quantified but a number of other factors do not lend themselves to individual assessment and are therefore dealt with in a summary manner, although their combined influence on cost differences is significant.

2. The factors which have been considered are:

- a) the effect on aircraft operating costs of differences among route groups in aircraft equipment being used;
- b) the effect of differences among route groups in the average length of flight stages;
- c) the effect of varying prices of fuel and oil in different parts of the world;
- d) the effect of different levels of airport user charges in different parts of the world;
- e) the effect of differences in the average load factor achieved on each route group; and
- f) other factors.

An examination of the influence exercised by each of the above on the operating costs for traffic in the route groups is made below and the resulting variations in the costs per passenger-kilometre from the world average are subsequently presented in Table 4-5 and discussed in paragraphs 21 and 22 of this chapter.

Aircraft mix and stage length [factors a) and b)]

3. The volume of traffic on a route and the geographical characteristics of the route (in particular the lengths of flight stages) determine the sizes of aircraft that are engaged in the traffic, the number of seat-kilometres per departure and per flying hour that can be produced by these aircraft, and the possible utilization of the aircraft in terms of flying hours per year. For these reasons, the geographical characteristics of a route group strongly influence the operating costs per seat-kilometre that will be incurred on that route group. Effects on these costs of differences among the route groups in aircraft mix and average stage length are discussed below.

Table 4-1. Operational and cost data for aircraft categories, 1989
(international scheduled passenger services)

Grouping of subsonic aircraft	Primary jet types operated on international scheduled services ¹	Percentage of world's international traffic (available seat-km) (%)	Average number of seats ²	Average length of flight stages operated (km)	Average utilization ³ (hours/day)	Aircraft operating costs ⁴	
						Dollars per block hour	Cents per available seat-km ⁵
World	-	100.0	242	1 781	9.1	4 300	2.3
Narrow-body, short-haul	B737 DC9 M80	8.7	114	802	7.2	2 280	3.6
Narrow-body, medium-haul	B727 B757 TU154	9.1	153	1 145	7.5	2 640	2.7
Narrow-body, long-haul	B707 DC8 IL62	2.5	165	2 635	6.4	2 630	2.1
Wide-body, medium-haul	A300 A310 B767 IL86 L1011	16.6	232	2 021	9.1	4 480	2.5
Wide-body, long-haul	B747 DC10 L1011-500	63.1	330	4 361	11.0	6 230	2.1

1. Only aircraft types providing more than 0.5 per cent of the world international scheduled available seat-kilometres in 1989 are listed in this column. The categorization of aircraft types is based on the average number of seats and average length of flight stages operated in 1989.
2. Available seat-kilometres divided by aircraft-kilometres flown.
3. Including domestic and non-scheduled operations of the international airlines concerned.
4. Data in these columns include flight operations expenses, aircraft fuel and oil (at the world average cost of 18.1 cents per litre), aircraft maintenance and overhaul, per and aircraft standing charges such as depreciation and interest charges. If prevailing regional prices rather than the world average price were to be used for aircraft fuel and oil there would be no change in the per seat-kilometre cost data presented, but small changes in some of the per block hour data.
5. Aircraft operating costs have been adjusted in this case to exclude costs attributable to freight and mail traffic.

4. In general, the aircraft operating costs per aircraft-kilometre or per seat-kilometre on a long-haul flight are lower than on a short-haul flight, mainly because of the higher block speed that may be achieved on a long-haul flight and the generally higher aircraft daily utilization recorded. Similarly, large aircraft which may be used where traffic density is high have lower aircraft operating costs per seat-kilometre than small aircraft. The combined impact of these two factors may be illustrated by looking at the average aircraft operating costs incurred in international passenger service in 1989 for different categories of aircraft. Table 4-1 presents the average aircraft operating costs per block hour and per available seat-kilometre for five categories of aircraft, grouped according to their size and by the length of haul for which they were generally used in 1989. The average hourly cost varied from \$2 280 for narrow-body short-haul aircraft to \$6 230 for wide-body long-haul aircraft, but primarily because of their greater productivity the average aircraft operating cost per available seat-kilometre (adjusted to exclude costs attributable to freight and mail traffic) of the wide-body long-haul aircraft was, at 2.1 cents, one of the lowest for any category. In 1989 this cost level was also achieved

for the narrow-body long-haul aircraft; the types of aircraft included in this group (for example, the B707, DC8 and IL62) are fairly old and therefore in general have relatively low standing charges. At the other end of the spectrum the narrow-body short-haul aircraft averaged 3.6 cents per seat-kilometre, which is some 71 per cent higher than the figure for long-haul aircraft.

5. Aircraft operational data for each route group (excluding utilization effects) are shown in Table 4-2. The average block speed achieved is shown to be significantly higher on route groups with a long average stage length such as the transatlantic and the transpacific routes than on route groups with a short average stage length such as Europe and the Middle East. This relative economic advantage for the operations of long-haul routes is amplified by the fact that large wide-body aircraft in 1989 accounted for a high proportion of the total capacity on long-haul routes but were being used less on the route groups

Table 4-2. Aircraft operational data by route group, 1989

Route group (short title)	Average length of flight stage (km)	Average block speed (km/h)	Percentage distribution		Average aircraft productivity: available seat-kilometres per block hour (thousands)
			Narrow-body	Wide-body	
I. All world international routes	1 781	660	20	80	160
II. International route groups					
1. North-Central America	1 221	607	51	49	110
2. Central America	729	584	99	1	86
3. North America	1 115	584	77	23	92
4. North-South America	2 086	712	29	71	156
5. South America	926	590	72	28	91
6. Europe	843	522	85	15	70
7. Middle East	901	527	43	57	95
8. Africa	898	607	59	41	88
9. Europe-Middle East	2 081	652	29	71	131
10. Europe-Africa	2 864	715	14	86	178
11. North Atlantic	4 229	753	3	97	219
12. Mid Atlantic	3 956	763	11	89	207
13. South Atlantic	3 640	786	6	94	225
14. Asia/Pacific	1 779	673	7	93	186
15. Europe-Asia/Pacific	3 797	737	5	95	227
16. North/Mid Pacific	5 495	788	2	98	264
17. South Pacific	4 945	798	3	97	266

with a short average stage length. The variation in average aircraft productivity resulting from variations in average block speed and average size of aircraft is very wide. For example, the seat-kilometres per aircraft block hour in the Central America, Europe and Africa route groups are in each case less than one-third of the seat-kilometres per block hour on the South Pacific route group.

6. Differences in aircraft fleet composition among route groups contribute to the differences in both aircraft and other operating costs, but mainly in the aircraft costs. The contribution to regional differences in aircraft operating costs arising from differences in aircraft mix (excluding the effects of differences in stage length, fuel prices and load factors) has been estimated and is presented in paragraphs 21 and 22.

7. Other operating costs as well as aircraft operating costs are of course also strongly influenced by the average length of flight stages operated in a route group. This is because certain important cost items, such as station expenses and landing charges, are primarily dependent upon the number of aircraft and passenger departures. Since the number of seat-kilometres (or passenger-kilometres) per departure increases proportionally with increasing stage length, the cost per seat-kilometre (or per passenger-kilometre) of station expenses and landing charges falls with increasing stage length. Estimated effects of differences in stage length on operating costs (both aircraft and other) are also presented in paragraphs 21 and 22.

Table 4-3. Estimated unit fuel prices and airport charges by region, 1989 (international scheduled services)

Area ¹	Aircraft fuel and oil prices (cents/litre)	Landing and associated airport charges (dollars/departed tonne) ²
World	18.1	8.2
North America	16.3	3.6
Central America/Caribbean	19.1	2.9
South America	21.8	4.6
Europe	17.4	13.6
Middle East	18.6	4.7
Africa	26.8	6.5
Asia/Pacific	18.9	7.9

1. More detailed descriptions of areas and route groups may be found in Appendix 3 on the reverse of the revenue and cost questionnaire.
2. Tonnes of aircraft maximum take-off weight.

Prices for aircraft fuel and oil [factor c)]

8. The estimated total consumption of aircraft fuel and oil on international subsonic jet passenger routes in 1989 was about 66 billion litres, and the total cost to the airlines was some U.S.\$12 billion for an average price per litre of 18.1 cents. This average price paid per litre represented an increase of some eight per cent over the 1988 average price of 16.7 cents per litre. In 1989 fuel represented about 14 per cent of the total passenger operating costs compared with 13 per cent in 1988.

9. Detailed estimates have been made of the average prices of fuel purchased in the different regions of the world (Table 4-3) and of the average prices of fuel consumed on the various route groups (Table 4-4). As shown in Table 4-3 on a regional basis the price per litre of fuel in 1989 ranged from about 16 cents in North America to some 27 cents in Africa (some 69 per cent higher than the price paid in North America). Between 1988 and 1989 changes in fuel prices varied from region to region, from a reduction of about four per cent in South America to an increase of some 12 per cent in North America.

Table 4-4. Estimated unit fuel prices and airport charges by route group, 1989 (international scheduled services)

Route group (short title)	Aircraft fuel and oil prices (cents/litre)	Landing and associated airport charges (dollars/depanded tonne) ¹
I. All world international routes	18.1	8.2
II. International route groups		
1. North-Central America	17.5	2.9
2. Central America	-	-
3. North America	16.0	2.7
4. North-South America	19.6	4.2
5. South America	21.6	5.1
6. Europe	17.2	15.4
7. Middle East	17.8	4.2
8. Africa	29.8	6.6
9. Europe-Middle East	17.9	8.7
10. Europe-Africa	22.5	8.7
11. North Atlantic	16.7	6.8
12. Mid Atlantic	19.6	7.4
13. South Atlantic	20.1	6.6
14. Asia/Pacific	18.4	7.7
15. Europe-Asia/Pacific	18.7	7.8
16. North/Mid Pacific	17.9	7.6
17. South Pacific	18.0	4.3

1. Tonnes of aircraft maximum take-off weight.

10. On a route group basis (Table 4-4) the estimated fuel prices range from a low of 16.0 cents per litre for routes within North America to a high of 29.8 cents per litre for routes within Africa. Comparing the two sets of fuel price estimates in Tables 4-3 and 4-4, both of which are derived from the same data sources, it may be seen that the average prices paid for fuel for international services carried out entirely within Africa (29.8 cents per litre) are significantly higher than the average prices for all fuel uplifted in Africa for international services to, from and within that region (26.7 cents per litre). Further analysis shows that airlines from outside this region have generally paid lower prices for fuel in the region concerned than airlines based in the region, possibly as a result of favourable terms of bulk purchasing arrangements covering a wider network of services.

Airport and associated charges [factor d]

11. Airport charges in 1989 represented about four per cent of the total costs for international passenger operations. The basis on which these charges are levied varies from airport to airport but aircraft gross weight is the predominant element and a broad and simple comparison of the levels of airport charges in different parts of the world can be based on dollars paid per tonne of aircraft maximum take-off weight. Using this measure, estimated average airport charges in different regions of the world are shown in Table 4-3. The table shows that the world average was 8.2 dollars per tonne and that the average charges in regions ranged from 2.9 dollars in Central America/Caribbean to 13.6 dollars in Europe. En-route facility charges are not generally included in these estimates because of their more limited significance (about two per cent of total costs) and because of the margin of uncertainty associated with their estimation on a regional basis.

12. Estimates of landing and associated airport charges have also been made on a route group basis and are shown in Table 4-4. The range of these estimates for route groups is from 2.7 dollars per tonne for traffic within North America to 15.4 dollars for traffic within Europe.

Load factor [factor e]

13. A large part of the total costs of operating a flight on a scheduled air service is independent of, or only moderately affected by, the number of passengers actually carried on the flight. Since, as shown in Table 3-1, the passenger load factors achieved in 1989 varied significantly among route groups, from a low of 58 per cent on routes within the Middle East and Africa to a high of 73 per cent on routes in the North and Mid Pacific, they had a significant influence on differences in total operating costs per passenger-kilometre. Estimated effects of differences in load factor on operating costs for each route group are presented in paragraphs 21 and 22.

Other causes of regional differences in costs

14. Among the factors that led to regional differences in the total cost of passenger operations in 1989, the varying aircraft operating costs, including the effect of varying prices of fuel, have been discussed above. The effect of

varying stage lengths and load factors has been assessed for both aircraft operating costs and other cost items but, with the exception of variations in airport charges, other effects of differences in non-aircraft cost items have not been analysed. The remaining cost items include "station expenses", "passenger services", "commission", "ticketing, sales and promotion" and "general, administrative and miscellaneous" and together accounted for some 52 per cent of the total costs for international passenger operations in 1989. Some of these cost items for passenger operations show significant differences among route groups even after extraction of any stage length and load factor effects. A general commentary concerning these items and their variation is given below.

15. Station expenses (column 5 in Table 3-2) relate mainly to the servicing of aircraft and passengers at airports. While they vary greatly among route groups, from 0.4 to 2.6 cents per passenger-kilometre, some of the variation is due to the effects of differences in stage length. If this effect is extracted from station expenses, routes in local South America show the lowest costs per passenger while routes across the North Atlantic show the highest costs.

16. Passenger service costs (column 6 in Table 3-2) relate primarily to cabin services provided in flight. In 1989 passenger service costs represented almost 15 per cent of total passenger operating costs. The differences in their level amongst the route groups, from 0.9 to 2.1 cents per passenger-kilometre, primarily reflect differences in salary, service levels and utilization of cabin crew.

17. Commission (column 7 in Table 3-2) is paid by each airline to travel agents and other airlines for the sale of passenger tickets. Commission is dependent on the extent to which airlines' sales are handled by agents in different parts of the world. However, because the commission is usually a certain percentage of the price of the ticket the variation in this cost item, from 0.6 to 1.5 cents per passenger-kilometre, is also related to the variation in average revenue per passenger-kilometre.

18. Ticketing, sales and promotion (column 8 in Table 3-2) is an item for which the level is largely determined by decision-making within individual airlines. In 1989 this item represented some 10 per cent of passenger costs. The variation among the route groups, from 0.6 to 2.0 cents per passenger-kilometre, reflects differing competitive situations and the extent to which airlines handle their own sales in the various route groups.

19. Commission, ticketing, sales and promotion, together reflect the over-all cost of selling passenger tickets. Depending on the route group, between 17 and 25 per cent of total passenger revenues are used to defray this cost.

20. General, administrative and miscellaneous expenses (column 9 in Table 3-2) vary from 0.3 to 0.9 cents per passenger-kilometre. This partly reflects variations in the organizational structure and the accounting practices of airlines in different parts of the world, but also variations in salary levels and staff productivity among regions. Additionally, economies of scale may be an important factor affecting variations in this cost item as large airlines, which tend to have lower administrative overheads per passenger-kilometre performed than smaller airlines, play a greater role on some route groups than

Table 4-5. Contributions to differences in costs amongst route groups, 1989

Route group (short title)	World average total passenger operating costs (1)	Effect of aircraft mix on direct operating costs (2)	Effect of stage length and average block speed (3)	Effect of aircraft fuel and oil prices (4)	Effect of landing and associated airport charges (5)	Effect of load factor (6)	Sum of effects in columns 2-6 (7)	Effect of other factors (8)	Actual total passenger operating costs: columns 1+7+8 (9)
(cents per passenger-kilometre)									
I. All world international routes	8.2	-	-	-	-	-	-	-	8.2
II. International route groups									
1. North-Central America	8.2	0.5	0.9	0.0	-0.2	0.3	1.5	-1.3	8.4
2. Central America	-	-	-	-	-	-	-	-	-
3. North America	8.2	0.6	1.2	-0.1	-0.2	0.7	2.2	-1.8	8.6
4. North-South America	8.2	0.0	-0.4	0.1	-0.2	0.5	0.0	0.1	8.3
5. South America	8.2	0.4	1.5	0.2	-0.1	1.0	3.0	-0.4	10.8
6. Europe	8.2	1.2	2.3	-0.1	0.3	0.9	4.6	3.9	16.7
7. Middle East	8.2	0.4	2.1	0.0	-0.2	1.4	3.7	0.2	12.1
8. Africa	8.2	0.7	1.5	0.7	-0.1	1.4	4.2	-0.4	12.0
9. Europe-Middle East	8.2	0.3	-0.1	0.0	0.0	0.7	0.9	0.6	9.7
10. Europe-Africa	8.2	-0.2	-0.7	0.3	0.0	0.3	-0.3	0.6	8.5
11. North Atlantic	8.2	-0.3	-1.1	-0.1	-0.1	0.0	-1.6	0.0	6.6
12. Mid Atlantic	8.2	-0.3	-1.1	0.1	0.0	-0.1	-1.4	0.0	6.8
13. South Atlantic	8.2	-0.3	-1.2	0.1	-0.1	-0.1	-1.6	1.3	7.9
14. Asia/Pacific	8.2	-0.1	-0.1	0.0	0.0	-0.2	-0.4	0.0	7.8
15. Europe-Asia/Pacific	8.2	-0.3	-1.0	0.0	0.0	-0.2	-1.5	0.0	6.7
16. North/Mid Pacific	8.2	-0.4	-1.4	0.0	0.0	-0.3	-2.1	0.5	6.6
17. South Pacific	8.2	-0.4	-1.4	0.0	-0.2	-0.1	-2.1	0.0	6.1

on others. In recent years, administrative costs, which include gains or losses due to changes in exchange rates, have been heavily influenced by fluctuations in exchange rates.

Summary of causes of regional differences in costs

21. The effects of the factors described in paragraphs 3 to 20 on the cost levels for route groups are shown in Table 4-5. Column 1 of that table shows against each route group the world average cost per passenger-kilometre in 1989, which was 8.2 cents. Columns 2 through 6 show the deviations from this world average that may be attributed to each of the individually assessed factors described in paragraphs 3 to 13 above, and column 8 shows the aggregate effect of the "other factors" (some other factors were described in summary form in paragraphs 14 to 20). Column 9 shows the resulting actual total costs per passenger-kilometre for each route group.

22. Comparing the various factors identified in columns 2 to 6 of Table 4-5 it will be noted that each of them contributed significantly to differences from the world average cost per passenger-kilometre. On 12 out of the 16 route groups, "stage length and average block speed" was the most important single factor and on the rest "load factor" was the most important single factor, but neither of them was the consistently dominant cause. Also, as may be seen by comparing column 7 (the sum of the effects in columns 2 to 6) with column 8, an important proportion of the differences in route group costs from the world average was due to the "other factors" which do not lend themselves to precise analysis.

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Appendix 1

DATA SOURCES AND COVERAGE

Sources of the data

1. Primary sources of information for this study were two questionnaires which were dispatched (under cover of State Letter EC 2/20.3.2-90/51 of 30 May 1990) to all Contracting States to be filled out with respect to their international carriers. One questionnaire sought information on scheduled and non-scheduled passenger, freight, mail and incidental revenues for each route group, together with corresponding volumes of traffic and capacity. Replies to this questionnaire were received with respect to 96 States. The second questionnaire sought information on costs for international scheduled passenger airlines, and replies were received with respect to 94 States. Facsimiles of the two questionnaires and a list of States for which replies were received are given in Appendix 3.

2. Another important source of information as far as scheduled operations were concerned was a computer analysis of timetable material prepared by publishers of the *Official Airline Guides*. The basic data provided by this source were, for each and every airline and aircraft type operating in each of the route groups, information on the planned number of seats (combination aircraft), number of departures, aircraft block hours and distance flown (these data are Copyright 1990 by Official Airline Guides, Inc., Oak Brook, Illinois). The ICAO Secretariat carried out research into the operating characteristics of aircraft types and sub-types, and provided Official Airline Guides with resulting data on fuel consumption per block hour (as a function of stage length), maximum take-off weight, payload and volumetric capacity. This information was related to the basic data to provide a bank of operating statistics for each route group and for each geographical area of operation within each route group, as well as aggregate statistics for each area and for the world as a whole.

3. A wide range of supplementary information sources was used, in particular data on airline traffic, traffic by flight stage, on-flight origin and destination traffic, fleet and personnel, and airline financial data regularly filed by Contracting States on Air Transport Reporting Forms and published in the ICAO *Digest of Statistics*.

Coverage of the data

4. For scheduled services, traffic, capacity and other operational data were derived both from the questionnaires and from the timetable material, supplemented by material from the regular statistical reports to ICAO, and may be considered as fully comprehensive of all international operations. Revenue and cost data originate essentially from the questionnaires, supplemented by national publications or other suitable sources of financial data where available; in the case of passenger traffic available revenue and cost data were adapted according to operational data to render them representative of all international operations (see Appendix 2). In the case of non-scheduled traffic, the sole source of both operational and financial data was the responses to the questionnaires, and the results shown in this study represent only these responses.

5. The study was based on revenue data obtained for 99 scheduled airlines (including 8 all-cargo airlines) and 14 other carriers, and on cost data for 83 scheduled passenger airlines.

6. The number of airlines and the coverage of international scheduled passenger traffic represented by revenue and cost data are shown in Table A1-1 by region of airline registration. The over-all representation in terms of available seat-kilometres is 88 per cent for revenue data and 86 per cent for cost data. Representation of each of the Central America/Caribbean and Middle East regions in 1989 was significantly lower than for the other regions.

7. For each route group the number of airlines and the percentage of traffic represented by these airlines are shown in Table A1-2. In terms of available seat-kilometres representation of revenue and costs data is 70 per cent or above for 14 of the 17 route groups. However, for routes "between and within the Caribbean and Central America" representation was so low as to cast some doubt on the validity of the results for that route group and hence figures for this route group are not presented in this Study, although their estimates are included in the worldwide totals.

8. The coverage of revenue data for non-scheduled passenger operations is shown in Table A1-3 and the coverage of revenue data for scheduled freight and mail services is shown in Table A1-4.

**REPRESENTATIVE NATURE OF REVENUE AND COST DATA FOR
SCHEDULED PASSENGER OPERATIONS, 1989**

Table A1-1. Representation by ICAO region of airline registration

Region	International scheduled available seat- kilometres (millions)	Revenue data represent			Cost data represent		
		Number of airlines	Available seat-kilometres		Number of airlines	Available seat-kilometres	
			No. (millions)	% of total		No. (millions)	% of total
All	1 205 338	91	1 055 427	88	83	1 038 569	86
Africa	51 957	15	42 069	81	15	42 069	81
Asia/Pacific	311 781	18	266 504	85	16	265 548	85
Europe	415 487	24	370 069	89	20	355 574	86
Middle East	61 685	5	32 937	53	5	32 937	53
North America	292 039	12	288 174	99	12	288 174	99
Central America/Caribbean	29 524	5	16 358	55	4	15 780	53
South America	42 865	12	39 316	92	11	38 487	90

Source: ICAO, Form A-1.

Table A1-2. Representation by international route group

Route group (short title)	Revenue data represent		Cost data represent	
	Number of airlines	Percentage of total scheduled seat-kilometres	Number of airlines	Percentage of total scheduled seat-kilometres
I. All world international routes	91	87	83	85
II. International route groups				
1. North-Central America	11	72	10	70
2. Central America	4	42	3	39
3. North America	13	98	13	98
4. North-South America	18	92	16	91
5. South America	10	68	9	64
6. Europe	25	84	21	79
7. Middle East	6	64	6	64
8. Africa	11	70	11	70
9. Europe-Middle East	26	73	24	71
10. Europe-Africa	30	83	29	82
11. North Atlantic	38	93	35	92
12. Mid Atlantic	12	77	12	77
13. South Atlantic	15	93	14	91
14. Asia/Pacific	19	82	18	81
15. Europe-Asia/Pacific	40	87	38	86
16. North/Mid Pacific	14	84	14	84
17. South Pacific	9	98	8	98

Table A1-3. Representative nature of revenue data for non-scheduled passenger operations, 1989, by ICAO region of carrier registration

Region	International non-scheduled passenger-kilometres performed (millions)			Revenue data represent								
				All carriers			International scheduled airlines			Other carriers		
	By all carriers	By international scheduled airlines	By other carriers	Number of carriers	Pass-km performed		Number of carriers	Pass-km performed		Number of carriers	Pass-km performed	
					No. (millions)	% of total		No. (millions)	% of total		No. (millions)	% of total
All	168 616	80 405	88 211	67	65 882	39	53	23 732	30	14	42 150	48
Africa	3 681	3 680	1	9	2 779	75	9	2 779	76	-	-	-
Asia/Pacific	2 543	2 533	10	9	1 782	70	9	1 782	70	-	-	-
Europe	139 186	57 258	81 928	24	47 511	34	11	7 633	13	13	39 878	49
Middle East	1 531	1 199	332	4	655	43	4	655	55	-	-	-
North America	19 267	13 345	5 922	11	12 338	64	10	10 066	75	1	2 272	38
Central America/ Caribbean	1 609	1 609	1	3	193	12	3	193	12	-	-	-
South America	799	781	18	7	624	78	7	624	80	-	-	-

1. Less than 0.5 million.

Source: ICAO Forms A-1 and A-2.

Table A1-4. Representative nature of revenue data for scheduled freight and mail services, 1989, by ICAO region of airline registration

Region	International scheduled freight tonne-km performed (millions)	Freight revenue data represent			International scheduled mail tonne-km performed (millions)	Mail revenue data represent		
		Number of airlines	Tonne-km performed			Number of airlines	Tonne-km performed	
			No. (millions)	% of Total			No. (millions)	% of total
All	44 964	97	37 937	84	2 077	81	1 853	89
Africa	1 080	15	797	74	41	13	31	76
Asia/Pacific	14 311	20	11 256	79	454	16	377	83
Europe	16 545	24	15 994	97	734	22	690	94
Middle East	2 481	5	902	36	55	5	28	51
North America	8 522	12	7 105	83	737	11	684	93
Central America/Caribbean	202	4	97	48	13	4	2	15
South America	1 828	17	1 786	98	43	10	41	95

Source: ICAO, Form A-1.

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Appendix 2

METHOD OF ANALYSIS AND MARGINS OF UNCERTAINTY

Method of analysis

General

1. Data sources in general are discussed in Appendix 1. All airline financial data were initially adjusted where necessary to represent the calendar year 1989, and converted where necessary from local currency to United States dollars. For currency conversions, use was made of the exchange rates provided by States in their reply to the questionnaires. In those cases where an exchange rate was not supplied, the rate used was the average "IATA Clearing House Five-Day Monthly Rate" for 1989.
2. Prior to detailed analysis all financial and operational data were verified (a) as to the mutual consistency and as to consistency with data for previous years, (b) with information provided on statistical reporting forms regularly submitted to ICAO, and (c) with data obtained from a computer analysis of published timetable material (see Appendix 1).

Analysis of available revenue data

3. Scheduled and/or non-scheduled passenger, freight and mail revenues for each international route group, together with corresponding volumes of traffic and capacity, as well as incidental revenues attributable directly to international scheduled services were obtained for individual carriers directly from the revenue questionnaires designed for this purpose (facsimiles of the revenue and the cost questionnaires are included in Appendix 3). This information for individual carriers was aggregated for each route group to obtain weighted average revenues per passenger-kilometre and per seat-kilometre (for passenger traffic) or per tonne-kilometre performed (for freight and mail traffic). In the case of scheduled operations the data for individual airlines, and hence the average unit revenues, include allowance for discounts, pro-rates, etc., but generally exclude deductions for commission payments.

Analysis of available cost data

4. Cost data are obtained and analysed only for international scheduled passenger airlines. While most scheduled (and non-scheduled) carriers maintain revenue and traffic data on a route by route and/or route group basis, far fewer maintain cost data in a correspondingly disaggregated form. Hence, in order to present data which are generally representative of scheduled passenger airline operations in each region of the world, and at the same time minimize the reporting burden on States and their airlines, a questionnaire was designed in which the requirement for disaggregation of system-wide operating costs was both sparing and in line with practices followed by a majority of airlines. The cost data obtained for individual airlines through this questionnaire were subsequently allocated by the Secretariat among route groups (as necessary, that is where an airline operated on more than one route group) using the analysis of published timetable material.

Table A2-1. Procedures used to allocate individual airline costs among route groups

Category of costs	Cost item (see note 1)	Airline data input to study	Cost allocation criteria
A. Cost related primarily to aircraft type	I.1 Flight operation expenses, excluding fuel and oil costs	System-wide costs and system-wide block hours flown for each aircraft type operated	I.1-I.4 Number of block hours flown by each aircraft type on each route group
	I.2 Aircraft maintenance and overhaul expenses		
	I.3 Aircraft depreciation and amortization costs		
	I.4 Interest charges on aircraft		
B. Costs related significantly both to aircraft type and geographical area of operation	II.1 Aircraft fuel and oil costs	Either: a) costs by geographical area of operation, or b) costs by route group (no allocation to route group necessary), or c) costs by aircraft type	II.1 Fuel consumption by each aircraft type in each area of operation
	II.2 Landing and associated airport charges		II.2 Maximum take-off weight times number of departures for each aircraft type in each area of operation
	II.3 En-route facility charges		II.3 Maximum take-off weight times number of block hours flown for each aircraft type in each area of operation
	II.4 Other station expenses		II.4 Maximum payload times number of departures for each aircraft type in each area of operation
C. Costs related significantly to volume of traffic or volume of capacity	III.1 Passenger service costs	System-wide costs	III.1 Number of seat-hours on each route group
	III.2 Commission payments		III.2 Passenger and freight revenue earned on scheduled services from each route group
	III.3 Other ticketing, sales and promotion costs		III.3 Total revenue earned from each route group
	III.4 General and administrative expenses		III.4 to IV.1 Number of tonne-kilometres performed in each route group
	III.5 Miscellaneous operating expenses		
	IV.1 Balance of miscellaneous non-operating items (excluding payments from public funds and balance of income from affiliated companies)		

1. Cost item references are those used in the cost questionnaire (see Appendix 3). The items themselves are described in the Reporting Guidelines on the reverse of the cost questionnaire.

5. The cost data obtained for an individual airline, and the procedures used for allocating these costs among the route groups on which the airline operated, may be divided into three broad categories, as shown in Table A2-1: firstly (A), operating costs which for a given airline and a given aircraft type may, for this purpose, be considered as independent of where the aircraft is flying; secondly (B), operating costs which are significantly related both to aircraft type and to geographical area of operation; and thirdly (C), operating costs and pertinent non-operating items which may be related only in part to aircraft type or to the region in which they are incurred, but which are related significantly to the volume of traffic or the volume of capacity in each route group.

6. Costs in the first category (A) were obtained from the data for each airline as an average system-wide cost per aircraft block hour for each aircraft type used in international scheduled service. The costs for each route group were calculated according to the number of block hours flown by each aircraft type operated by the airline on that route group.

7. Costs in the second category (B) were recorded for each airline by route group or by geographical area (or in a few instances by aircraft type). Where recorded by area or by aircraft type, data were adapted to obtain corresponding data by route group using appropriate operational criteria (such as consumption in the case of "aircraft fuel and oil"). The relationships between route groups, geographical areas and aircraft types in terms of operational data were available from the computer analysis of timetable material.

8. Costs in the third category (C) were recorded as system-wide totals for the operations of each airline. These costs were disaggregated into route group costs using a suitable allocation parameter for each cost item. The allocation parameter devised for each item bears a direct or indirect relationship with the volume of traffic or capacity in each route group. In the case of "Commission payments" and "Other ticketing, sales and promotion costs", the allocation parameter used is the total revenue earned from each route group, thereby including effects both from traffic and from regional differences in revenue yields (and hence regional differences in ticketing, sales and promotion costs).

9. For some airlines, cost data within the three categories were reported relating to domestic operations and/or international non-scheduled operations as well as to international scheduled operations. Such costs associated with domestic and non-scheduled operations were subtracted using the same allocation procedures as were used to distribute costs among route groups.

10. As far as data for individual airlines were concerned, total costs for the scheduled international passenger flights in each route group were estimated by summing the itemized costs allocated to the route group. Finally, costs allocable to the carriage of freight and mail on passenger flights were deducted from these total costs to arrive at passenger costs. For this purpose it was assumed that the cost of carriage of freight and mail on passenger and combination aircraft on a route group was equal to the freight and mail revenue from operations of these aircraft.

*Estimates of revenues and costs for airlines
for which financial data were not available*

11. The procedures described above lead to the production of total revenues and (for international scheduled passenger traffic) total costs on each route group by airline region of registration for all those carriers for which the basic financial data were available. In most cases, this financial database did not include all carriers operations. However, for scheduled passenger traffic, estimated revenues and costs presented in this study are formulated to cover all airlines operating on each route group.

12. In the case of revenues the reported average revenue yield per passenger-kilometre for airlines registered in the same region within each route group has been applied to the total revenue passenger-kilometre for all airlines registered in that region operating on the route group.

13. In the case of costs the estimates for non-reported airlines have been based on cost data for reported airlines from the same region of registration for the route group, but also take into account differences in the operating characteristics of the two groups of airlines concerned (including differences in load factors). With respect to the costs in category A (see Table A2-1), the average costs per block hour for the aircraft of airlines for which cost data were available were applied to the hours flown by the same aircraft types by non-reported airlines from the same region of registration, thus taking into account differences in aircraft fleet, in block speed and in seating configuration. Costs in the categories B and C were similarly estimated on the basis of criteria parallel to those used in allocating costs of individual airlines among route groups.

14. For some route groups where airlines of a particular region have a very low representation (such as Central America and the Caribbean, and the Middle East), the grossing-up process for revenues and costs was adjusted to take into account the revenues and costs of major non-reported airlines on the basis of data provided for previous studies as well as data regularly collected for ICAO Digests of Statistics.

Margins of uncertainty

General

15. It is important to recognize that the revenue and cost data presented in this Circular are not perfectly defined quantities, but involve margins of uncertainty. Such margins of uncertainty are inherent in any presentation of airline financial data which covers a multiplicity of currencies, which involves disaggregation of system-wide revenues and costs, or which has an incomplete database. Hence an important feature of the method used in this series of studies has been to identify and evaluate the various sources of uncertainty for the purpose of establishing the degree of precision in the published data and hence the constraints on drawing conclusions from these data. The evaluations concerned were carried out by means of statistical analysis of detailed airline data and by means of tests as to the sensitivity of the published data to the procedures used in the study. The resulting assessments of

margins of uncertainty in average unit revenues, average unit costs and average revenue/cost ratios published in this study for scheduled passenger traffic in 1989 are presented below.

Estimates of unit revenues

16. The margin of uncertainty on the estimated unit revenues for a route group arises from limitations on the quality of reported data, from exchange rate fluctuations and, for scheduled passenger traffic, from the assumption that the average yield for non-reported airlines is the same as that for reported airlines on the same route group. An analysis was carried out to evaluate each of these sources of uncertainty and their cumulative effect, thus producing composite margins of uncertainty for the various route groups. The conclusion was that the estimated scheduled passenger revenue per passenger-kilometre for almost all the route groups presented can be relied upon to ± 6 per cent. However, for routes between and within Central America and the Caribbean, the representation was such as to throw some doubt on the validity of the results for that route group, and hence the revenue (and cost) figures for that route group are not presented in this study although their estimates are included in the worldwide totals. A significantly narrower margin of uncertainty than ± 6 per cent applies for those route groups where the representation was relatively high. On a global bases, taking into account all route groups as a whole, the margin of uncertainty is reduced by compensatory effects and by scale, and is estimated at ± 3 per cent.

Estimates of unit costs

17. The estimates of unit passenger costs for a route group contain similar elements of uncertainty as those for passenger revenues, plus further elements which arise from the need to allocate costs among route groups according to standardized procedures. These additional sources of uncertainty arise because:

- a) the generic nature of some cost items (for example general administrative costs) makes their allocation among route groups a matter of convention; and
- b) even for those cost items which are region or route-specific, the standardized allocation procedures do not take into account the detailed conditions under which individual airlines operate.

18. As for the revenue data, a composite margin of uncertainty was developed in respect of the average unit costs for each route group and for all route groups together. The margin of uncertainty on the estimated scheduled passenger costs per passenger-kilometre for all the other route groups presented is considered to be within ± 10 per cent. Route groups with high representation show a somewhat narrower margin of uncertainty. On a global basis, taking into account all route groups as a whole, the margin of uncertainty in the average costs per passenger-kilometre is estimated at ± 5 per cent.

19. On route groups where the margin of uncertainty approaches ± 10 per cent the contribution of different sources of uncertainty is approximately as follows:

Sources of uncertainty	Relative contribution to margin of uncertainty
Incomplete cost database	3
Generic nature of certain costs and use of standardized allocation procedures	3
Fluctuations in currency exchange rates	2
Other (primarily imperfections in reported data)	2
All	10

20. Much of the uncertainty arising from the generic nature of certain costs is inherent and cannot be influenced (see paragraph 17), and little can be done to reduce the uncertainty arising from fluctuations in currency exchange rate. A major factor in these studies is therefore getting as much coverage of financial data as possible, while at the same time making efforts to improve the quality of reported data.

21. All the above estimates of uncertainty apply only to over-all average cost data (as presented in Chapter 3, Table 3-1). Estimates of individual elements making up the over-all cost are in a number of cases subject to wider margins of uncertainty.

Estimates of revenue/cost ratios

22. The estimated ratios of revenues to costs have margins of uncertainty which vary from route group to route group depending on the margins of uncertainty in the estimated revenue and cost data. It should be noted, however, that the uncertainties in the revenue and the cost figures for a route group are to some extent inter-dependent; in other words, if the revenue on a route group is over-estimated, the cost figure is also probably over-estimated. This circumstance reduces the margin of uncertainty in the revenue/cost ratios compared with those for either the revenue data alone or the cost data alone. The composite margin of uncertainty for the revenue/cost ratio for individual route group in this study is estimated at ± 5 per cent, and for all the route groups together it is estimated at ± 2.5 per cent.

Appendix 3
QUESTIONNAIRES RELATED TO REVENUES AND COSTS

I. Facsimiles of questionnaires and attachments

QUESTIONNAIRE ON REVENUES OF INTERNATIONAL SCHEDULED AND NON-SCHEDULED AIR CARRIERS

(Reporting Guidelines and Route Group Descriptions Overleaf)

CARRIER NAME: _____ CALENDAR PERIOD: 12 MONTHS FROM _____ TO _____ REPORTING CURRENCY (US\$ OR NATIONAL): _____ EXCHANGE RATE BETWEEN NATIONAL CURRENCY AND THE US DOLLAR DURING PERIOD: 1 US\$ = _____	TOTAL ALL SERVICES (DOMESTIC PLUS INTERNATIONAL)	TOTAL DOMESTIC SERVICES	TOTAL INTERNATIONAL SERVICES (TOTAL FOR ROUTE GROUPS 1 TO 17)	INTERNATIONAL SERVICES BY ROUTE GROUP																
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
SECTION I - SCHEDULED SERVICES I.1 Revenue a) passenger traffic (including excess baggage) b) freight traffic c) mail traffic d) other I.2 Corresponding Volume of Traffic and Capacity a) passenger-kilometres (millions) b) seat-kilometres (millions) c) freight tonne-kilometres performed (millions) d) mail tonne-kilometres performed (thousands) e) available tonne-kilometres (millions) I.3 All-Cargo Services Only (Included in I.1 and I.2 above) a) revenue (total) b) tonne-kilometres performed (millions)																				
SECTION II - NON-SCHEDULED OPERATIONS II.1 Revenue a) passenger traffic b) freight traffic II.2 Corresponding Volume of Traffic and Capacity a) passenger-kilometres (millions) b) seat-kilometres (millions) c) freight tonne-kilometres performed (millions) d) available tonne-kilometres (millions)																				
Remarks (Include description of any deviations from Reporting Guidelines and Route Group Descriptions overleaf.)																				

REPORTING GUIDELINES

GENERAL

- a) This questionnaire is to be returned completed by ICAO Contracting States for each of their major international scheduled and non-scheduled air carriers (including any all-cargo carriers). The material provided will not be made public in such a way as to permit identification of individual operators. Information provided should be the total amount for a 12-month period as close as possible to the calendar year specified in the covering State Letter, with the period being identified in the space provided. It is recognized that, in order for your reply to reach ICAO by the date indicated in the State Letter, final audited financial data may not be available, but preliminary data are acceptable.
- b) Data for all-cargo aircraft operations should be included in the relevant sections of the questionnaire. Data for scheduled services with such aircraft should be included in Items 1.1 and I.2, and specified under I.3 if possible.
- c) Financial data may be provided either in terms of national currency or in terms of U.S. dollars. In either case the weighted average annual exchange rate used or to be applied to convert national currency into U.S. dollars should be specified in the space provided.
- d) A brief description of each financial data item is given below; for more detailed definitions see the Instructions for completion of ICAO Air Transport Reporting Form EF-1, for airline Financial Data. For definitions of traffic and capacity data items see ICAO Air Transport Reporting Form A-1 for airline Traffic data.
- e) Descriptions of the route groups, which are based on those used by IATA's Cost Committee, are also given below, followed by guidelines on allocating data amongst them.

SECTION I - SCHEDULED SERVICES

For Items I.1 a) to I.1 c) and I.3 a) report gross revenues related to scheduled flights before capacity equalization payments arising from pooled services and from the sale of own capacity to other carriers.

For Item I.1 d) Other revenue is intended to include on a net basis capacity equalization payments arising from pooled services and from the sale of own capacity to other carriers; and on a gross basis (with related expenses reported under the relevant expense item, indicate where different) incidental revenues accruing from air transportation services such as revenues from passengers paying less than 25 per cent of the normal applicable fare; commissions received on sales of transportation on other carriers; "no-show" and cancellation fees. Exclude revenue accruing from the provision of services other than for air transportation, such as for surface transportation; food services; service and maintenance sales; handling services for third parties; and property.

SECTION II - NON-SCHEDULED OPERATIONS

Include revenue derived from all non-scheduled flights performed for remuneration, including empty flights related thereto, when the responsibility for the performance of transportation is that of the carrier reported.

DESCRIPTIONS OF ROUTE GROUPS

1. Between North America and Central America/Caribbean

Includes routes between on the one hand Canada and/or the United States (including Alaska and Hawaii) and on the other hand Central America and the Caribbean. Routes between the United States and Puerto Rico/Virgin Islands are considered domestic and are excluded. Central America/Caribbean is defined as the geographical area covered by route group 2 below but excluding Mexico.

2. Between and within Central America and the Caribbean

Includes routes between or among the Bahamas, Belize, Bermuda, Costa Rica, El Salvador, Guatemala, Honduras, the islands of the Caribbean Sea (including Puerto Rico and the Virgin Islands), Mexico, Nicaragua and Panama.

3. Between Canada, Mexico and United States

Includes routes between or among the above States. The United States includes Alaska and Hawaii but excludes Puerto Rico and the Virgin Islands.

4. Between North America/Central America/Caribbean and South America

Includes routes between the geographical areas defined on the one hand by route group 1 and/or Mexico and on the other hand by route group 5 ("Local South America").

5. Local South America

Includes routes between or among the following States: Argentina, Bolivia, Brazil, Chile, Colombia (including San Andres Islands), Ecuador, Falkland Islands (Malvinas), French Guiana, Guyana, Paraguay, Peru, Suriname, Uruguay and Venezuela.

6. Local Europe

Includes routes between or among the States of geographical Europe, Algeria, Azores, Canary Islands, Greenland, Iceland, Madeira, Malta, Morocco, Tunisia and Turkey.

7. Local Middle East

Includes routes between or among the following States: Bahrain, Cyprus, Democratic Yemen, Egypt, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Sudan, Syrian Arab Republic, United Arab Emirates and Yemen.

8. Local Africa

Includes routes between or among the States of continental Africa and offshore islands, but excluding Algeria, Azores, Canary Islands, Egypt, Madeira, Malta, Morocco, Sudan and Tunisia.

9. Between Europe and Middle East

Includes routes between the two geographical areas defined by route group 6 ("Local Europe") and route group 7 ("Local Middle East") respectively.

10. Between Europe/Middle East and Africa

Includes routes between on the one hand the geographical areas defined by route group 6 ("Local Europe") and/or route group 7 ("Local Middle East") and on the other hand the geographical area defined by route group 8 ("Local Africa").

11. North Atlantic

Includes routes between on the one hand Canada and/or the United States (including Alaska and Hawaii) and on the other hand the geographical areas defined by IATA Tariff Conference 2 ("Local Europe" and/or "Local Middle East" and/or "Local Africa").

12. Mid Atlantic

Includes routes between on the one hand gateway points in the geographical areas defined by route group 2 and/or route group 5 ("Local South America") but north of Rio de Janeiro and on the other hand the geographical areas defined by IATA Tariff Conference 2 ("Local Europe" and/or "Local Middle East" and/or "Local Africa").

13. South Atlantic

Includes routes between on the one hand Rio de Janeiro or any other gateway south thereof in route group 5 ("Local South America") and on the other hand the geographical areas defined by IATA Tariff Conference 2 ("Local Europe" and/or "Local Middle East" and/or "Local Africa").

14. Local Asia/Pacific

Includes IATA Tariff Conference 3, that is international routes within Asia to the east of the Islamic Republic of Iran and of the Ural Mountains, Australia, New Zealand, Papua New Guinea, the islands of the Pacific Ocean excluding the Hawaiian Islands, Midway and Palmyra.

15. Between Europe/Middle East/Africa and Asia/Pacific

Includes routes between the geographical areas defined by IATA Tariff Conference 2 on the one hand and that defined by IATA Tariff Conference 3 on the other hand.

16. North and Mid Pacific

Includes routes via the North and Central Pacific Ocean between on the one hand points in the Americas (that is IATA Tariff Conference 1) and on the other hand Asia and/or the islands adjacent thereto (that is IATA Tariff Conference 3 except Australia, New Zealand, Papua New Guinea and the islands of the South Pacific).

17. South Pacific

Includes routes via the South Pacific Ocean between on the one hand points in the Americas (that is IATA Tariff Conference 1) and on the other hand Australia, New Zealand, Papua New Guinea and the islands of the South Pacific.

ALLOCATION TO ROUTE GROUPS

All data referring to domestic legs of international operations should be included as international in data for the route group concerned. Any service with a single flight number should be allocated to the route group which covers travel from the point of origin to the point of destination. For example, a flight Zurich-Geneva-Abidjan-Dakar should be reported as a Europe/Middle East-Africa flight (in route group 10) and not split between domestic, Europe-Africa and Local Africa. Specify all reporting differences.

Also specify any services which fall into more than one route group, including the criterion used for allocating data amongst the route groups concerned.

GENERAL

- a) This questionnaire is to be returned completed by ICAO Contracting States for each of their airlines that provide international scheduled air passenger services. The material provided will not be made public in such a way as to permit identification of individual operators. Information provided should be the total amount for a 12-month period as close as possible to the calendar year specified in the covering State Letter, with the period being identified in the space provided. It is recognized that, in order for your reply to reach ICAO by the date indicated in the State Letter, final audited financial data may not be available, but preliminary data are acceptable. Similarly, if full information is not available for any Section of the questionnaire, partial and/or aggregated data would be appreciated.
- b) All data provided should preferably refer only to international scheduled services. Should carriers not be able to break out such information separately, the domestic and/or non-scheduled data should be included; the appropriate box(es) at the beginning of each Section should then be checked. Data referring to domestic legs of international services should be included as international. Indicate any exceptions.
- c) Financial data may be provided either in terms of national currency or in terms of U.S. dollars. In either case the weighted average annual exchange rate used or to be applied to convert national currency into U.S. dollars should be specified in the space provided.
- d) All expense, revenue and operating data relating to freight and mail, including those for all-cargo aircraft operations, should be included where relevant in the questionnaire. Expenses incurred for the provision of services to other airlines such as maintenance, handling and catering should be excluded.
- e) A brief description of each data item is given below. More detailed definitions of financial data items are given in the instructions for completion of ICAO Air Transport Reporting Form EF-1, for airline Financial Data.

SECTION I - EXPENSES AND OPERATING DATA BY AIRCRAFT TYPE

Report for all aircraft types used, whether combination or all-cargo, using model designation (e.g. A300-B4, DC10-30CF, Boeing 747-200F).

- I.1 Flight operation expenses, excluding fuel and oil costs. This item comprises flight crew salaries and expenses, flight equipment insurance, rental of flight equipment (excluding any payments made under aircraft capital or finance lease arrangements), flight crew training, and other flight expenses excluding those covered by Items I.2, I.3, I.4 and II.1.
- I.2 Maintenance and overhaul expenses. Include here all expenses incurred for the repair, overhaul and maintenance of flight equipment, including payments to outside contractors and manufacturers. Exclude expenses incurred for the provision of maintenance and overhaul services to other airlines.
- I.3 Depreciation and amortization costs. Incorporate all such costs relating to flight equipment, including depreciation charges for aircraft acquired through capital or finance lease arrangements. Depreciation of ground property and equipment should be included if possible under the appropriate headings or in Item III.5.
- I.4 Interest charges. Include here gross interest charges on loans for the purchase of flight equipment, including the interest element of aircraft financing leases. Interest charges on other loans or overdrafts should be reported net under Item III.5.
- I.5 Revenue block hours. Provide data by aircraft type wherever possible, even where disaggregated cost data for this Section are not available.

SECTION II - OPERATING EXPENSES BY GEOGRAPHICAL AREA

Geographical Areas are described below. Data for this Section may alternatively be reported by route group in accordance with the descriptions appearing in the associated questionnaire on revenues (in which case please specify each route group).

- II.1 Aircraft fuel and oil. Include through-put charges, non-refundable duties and taxes.
- II.2 Landing and associated airport charges. Include all charges and fees related to air traffic operations which are levied against the airline for services provided at the airport for landing charges, passenger and cargo fees, security, parking and hangar charges.

II.3 Route facility charges. Include all fees levied against the airline for the provision of route facilities and services. Where a single charge is levied for both airport and route facilities, the amount should be reported under Item II.2.

II.4 Station expenses. Include all expenses incurred (passenger and/or cargo) for traffic handling and aircraft loading and servicing, including payments to outside contractors. Exclude expenses incurred for sales staff at airports (to be included under Item III.3) and for the handling and servicing of traffic and aircraft of other airlines.

SECTION III - OTHER OPERATING EXPENSES

III.1 Passenger services. Include all expenses incurred for the provision of passenger services (including pay, allowances and expenses of cabin attendants and other passenger service personnel); premiums for passenger liability and accident insurance paid by the airline; expenses of handling passengers incurred because of cancelled and delayed flights. Exclude expenses incurred for the provision of passenger services to other airlines.

III.2 Commission payments. Include commissions payable to third parties for the sale of transportation on the airline's services, preferably on a gross basis (specify where different).

III.3 Other ticketing, sales and promotion. Include all expenses related to these three functions, including staff, accommodation, reservations, and advertising/publicity.

III.4 General and administrative. Include all expenses incurred in performing the general and administrative functions of the airline. Overhead costs directly related to specific functions should preferably be allocated elsewhere under the appropriate heading.

III.5 Miscellaneous operating expenses. Include all operating expenses which could not be assigned elsewhere in Sections I to III. Include here net interest charges on loans and overdrafts not related to the purchase of flight equipment (see Item I.4).

SECTION IV - BALANCE OF MISCELLANEOUS NON-OPERATING ITEMS

Include profits and losses from retirement of property and equipment, foreign exchange transactions, and miscellaneous non-operating items. Exclude payments from public funds and balance of income from affiliated companies.

DESCRIPTIONS OF GEOGRAPHICAL AREASNorth America

Canada and United States, including Hawaii and Alaska but excluding Puerto Rico and the Virgin Islands.

Central America/Caribbean

Bahamas, Belize, Bermuda, Costa Rica, El Salvador, Guatemala, Honduras, the islands of the Caribbean Sea (including Puerto Rico and the Virgin Islands), Mexico, Nicaragua and Panama.

South America

Argentina, Bolivia, Brazil, Chile, Colombia (including San Andres Islands), Ecuador, Falkland Islands (Malvinas), French Guiana, Guyana, Paraguay, Peru, Suriname, Uruguay and Venezuela.

Europe

Geographical Europe and Algeria, Azores, Canary Islands, Greenland, Iceland, Madeira, Malta, Morocco, Tunisia and Turkey.

Middle East

Bahrain, Cyprus, Democratic Yemen, Egypt, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Sudan, Syrian Arab Republic, United Arab Emirates and Yemen.

Africa

The continent of Africa and offshore islands, but excluding Algeria, Azores, Canary Islands, Egypt, Madeira, Malta, Morocco, Sudan and Tunisia.

Asia/Pacific

IATA Tariff Conference 3 (includes Asia to the east of the Islamic Republic of Iran and of the Ural Mountains, Australia, New Zealand, Papua New Guinea and the islands of the Pacific Ocean excluding the Hawaiian Islands, Midway and Palmyra).

II. Respondents to questionnaires

Contracting States that provided replies to the air carrier revenue and cost questionnaires issued under cover of State Letter EC 2/20.3.2-90/51 of 30 May 1990:

Algeria, Argentina, Australia, Austria, Bangladesh, Barbados, Belgium, Botswana, Brazil, Brunei Darussalam, Burundi, Canada, Chile, Colombia, Costa Rica, Cuba, Cyprus, Czechoslovakia, Dominican Republic¹, Ecuador, Egypt, El Salvador, Ethiopia, Fiji, Finland, France, Federal Republic of Germany, Greece, Gulf States², Honduras, Hungary, India, Indonesia, Islamic Republic of Iran, Ireland, Italy, Japan, Jordan, Kenya Kiribati, Lao People's Democratic Republic, Lesotho, Madagascar, Malawi, Malaysia, Malta, Mauritius, Mexico, Morocco, Myanmar, Nepal, Kingdom of the Netherlands, New Zealand, Nigeria, Pakistan, Papua New Guinea, Paraguay¹, Peru, Philippines, Portugal, Republic of Korea, Saudi Arabia, Seychelles, Singapore, Spain, Sri Lanka, Sweden, Switzerland, Thailand, Tunisia, United Arab Emirates, United Kingdom, United Republic of Tanzania, United States, Venezuela, Yaoundé Treaty States³, Zambia and Zimbabwe.

- END -

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1. Revenue data only; no cost data were provided for the airline(s) concerned.
 2. Reply for Gulf Air which is the international scheduled airline of Bahrain, Qatar, Oman and the United Arab Emirates.
 3. Reply for Air Afrique which is the international scheduled airline of Benin, Burkina Faso, Central African Republic, Chad, Congo, Côte d'Ivoire, Mauritania, Niger, Senegal and Togo.

ICAO PUBLICATIONS IN THE AIR TRANSPORT FIELD

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

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

Council Statements on policy relating to air transport questions, such as the economics of airports and en-route air navigation facilities, taxation and aims in the field of facilitation;

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

Circulars providing specialized information of interest to Contracting States. They include regional studies on the development of international air passenger, freight and mail traffic and specialized studies of a world-wide nature;

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

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

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