AT W/SF-757-ST

TRANSPORT & TOURISM TECHNICIANS LIMITED
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PRELIMINARY FEASIBILITY STUDY OF THE ECONOMICS OF AIR CARGO INTEGRATION IN LATIN AMERICA

FOR: Aerovias Nacionales De Colombia, S.A.

Aerolineas Argentinas

Venezolana Internacional De Aviacion, S.A.

Aerolineas Peruanas, S.A.

Compania Ecuatoriana De Aviacion

Lloyd Aereo Boliviana

Linea Aerea Nacional-Chile

LONDON, August 1969

MAIN INDEX

SUMMARY OF SECTIONS

Individual Sections are summarised on the GREEN pages preceding each Section and the Appendices and Annexes.

SECTION 1

INTRODUCTION

INDEX

OBJECTIVE AND TERMS OF REFERENCE

The Objective of the Study is to produce guide-lines for the Companies, or other airlines in Latin America and also to respective national governments in signing agreements on integration in the field of air freight transport between territories of the various countries concerned and routes with third countries where pertinant.

The Terms of Reference of the Study, from the document ATN/SF-757-ST, cover the following aspects:-

a. Determination of present and future air freight requirements in the region. Regional traffic patterns and those towards other regions. Distribution in time, packaging, size of shipments, nature of freight.

b. Distribution of demand between various regional and non-regional companies. (Direct investigation on freight demand based on studies of origin and destination, on loading documents (airway bills) in order to establish the present level, seasonal patterns and future orientation in the demand of the region, including points of import and export for the movement of non-regional freight).

c. Economic research to determine the possible increase in goods transported by sectors, the volume of freight traffic which this may cause and the nature of increases in the different clasifications of goods (goods urgently required by consumers and producers; goods which deteriorate under excessive transport time; goods with a relatively high value/weight : goods destined for areas where surface transport is too slow, expensive or difficult).

d. Supply characteristics of costs of the different freight transport services, additional capital investments required in order to increase capacity etc.

e. Economic comparison between present and potential competition between alternative forms of transport.

f. Structure of rates and its rationalization.

g. Analysis of costs and profits. Comparison of factors of supply and demand in order to establish profit margins.

h. Description of routes which may be profitable.

APPROACH TO THE STUDY

A major part of this Study has been to establish, in as much detail as possible, the future environment in which the projected integration of the airlines cargo operations must exist.

This environment includes -

a. The likely demand of air cargo under all possible conditions (Sections 2 and 3)

b. The likely revenue and costs of air cargo operations (Section 4)

c. The likely air cargo supply and the competitive situation of Latin American air cargo (Sections 5 and 7)

Following from this, the other Sections of the Study are concerned with indicating the economics of integration - with providing each airline with the basis of assessing not only the common benefits of co-operation, but also their individual position. This indicates a comparison of integrated operation and non-integrated operation. Certain difficulties are associated with this.

The individual airlines have open to them a wide range of alternatives, including operating singly, as now, forming associations, pools, agreements with regional or extra-regional carriers. Any attempt to predict, in detail on a ten-year period, the entire future set of alternatives to integration, for each airline, is clearly ruled out. Also prediction, even in broad terms, of each airlines future would be invidious in a joint Study of this nature.

This Study has therefore concentrated on evaluating a future including the major recommended form of co-operation and describing the alternative in terms typical to the carriers operating independantly.

A great deal of information from a wide variety of sources, has been analysed in this Study. Rather than unbalance the Study with excessive weight of material, the exhibits, presentations etc. have been restricted to those -

a. Supporting the argument

b. Indicating, by example, the methods of analysis.

Detailed information in the Study is restricted to that generally available from sources such as ICAO, the international agencies, national agencies and organisations. Confidential details of individual airlines not generally available, are presented as average, typical etc. without disclosing the source.

ABBREVIATIONS USED IN THE STUDY

FALAC	=	Flota Aerea Latina America De Carga
UN	=	United Nations
ECLA (or CEPAL)	=	Economic Commission for Latina America
IMF	=	International Monetary Fund
PAU	=	Pan American Union
OAS	=	Organisation of American States
LAFTA	=	Latin American Common Market
ICAO	=	International Civil Aviation Organisation
IATA	=	International Air Transport Association
IDB	=	Inter-American Development Bank
IBRD	=	International Bank of Reconstruction and Development

Throughout this Study, FALAC has been used:-

a. to denote both the hypothetical Integrated Air Cargo Enterprise

and also

b. as an adjective to describe the seven contracting airlines and the corresponding countries. Hence FALAC countries -

ARGENTINA

BOLIVIA

CHILE

COLOMBIA

PERU

VENEZUELA

ECUADOR

MAIN CONCLUSIONS

There is no doubt that integration of international air cargo activities by the seven airlines would offer substantial financial benefits.

However serious problems will arise on integrating cargo operations of these seven airlines. They are very dissimilar in size, growth, aims, responsibilities and enthusiasm for the project. A smaller number of more homogeneous carriers would certainly have a better chance of success.

Without integration, the future will be one of increased competition, excessive cargo capacity and consequent losses for most of the airlines. Non-regional carriers will consolidate their already strong position.

It is probable that the best chance of integration lies in a multi-national company which will operate *all* the international cargo services of each airline, including responsibility for belly-hold cargo.

SECTION 2

THE AIRLINES AND THE INDUSTRY

THE RATE OF GROWTH OF INTERNATIONAL AIR FREIGHT IN SOUTH AMERICA IS NOT MARKEDLY DIFFERENT FROM GROWTH RATES IN OTHER REGIONS OF THE WORLD. ALTHOUGH INTERNATIONAL AIR CARGO IN THE REGION IS UNDERDEVELOPED THERE ARE NO BASIC REASONS FOR EXPECTING A GROWTH RATE HIGHER THAN IN EQUIVALENT DEVELOPING REGIONS.

THE SEVEN AIRLINES ARE VERY DIFFERENT IN THEIR SIZES, RATES OF GROWTH, PROFITABILITY, RESOURCES AND AIMS.

FOR ALL THE AIRLINES, CARGO PROVIDES A LARGE AND GROWING SOURCE OF REVENUE AND ALL THE AIRLINES CLEARLY WISH TO HOLD OR EXPAND THEIR POSITION IN AIR FREIGHTING. THERE IS A GREAT DEAL OF COMMONALITY OF ROUTE STRUCTURE AND AT THE PRESENT TIME MANY OF THE SEVEN AIRLINES ACTIVELY COMPETE ON MANY SECTORS.

THE VARIETY OF STRUCTURES AND AIMS AND THE PRESENT SITUATION OF DIRECT COMPETITION INDICATE GREAT DIFFICULTIES IN CONSIDERING INTEGRATION OF THE ENTIRE SEVEN AIRLINES. A SMALLER, MORE HOMOGENEOUS GROUPING MIGHT BE MORE REALISTIC.

MOST OF THE INTER-CAPITAL ROUTES HAVE NO DIRECT ALL-FREIGHT SERVICES. THE FALAC CARRIERS ARE ESSENTIALLY BELLY-HOLD CARRIERS IN INTERNATIONAL FREIGHT OPERATIONS. NONE OF THE SEVEN AIRLINES HAS MODERN ALL-CARGO AIRCRAFT ALTHOUGH MANY SUCH SERVICES ARE PROVIDED BY COMPETING CARRIERS, LARGELY EXTRA REGIONAL.

THERE IS A STRONG LIKELIHOOD THAT SOME AT LEAST OF THE SEVEN AIRLINES WILL PURCHASE MODERN ALL-CARGO AIRCRAFT IN THE NEAR FUTURE IN AN ATTEMPT TO COMPETE WITH EXTRA REGIONAL CARRIERS AS WELL AS WITH EACH OTHER.

ALTHOUGH EACH OF THE SEVEN AIRLINES IS THE MAJOR NATIONAL CARRIER, EVEN THE LARGEST OF THEM IS VERY MODEST IN RELATION TO OTHER WORLD CARRIERS INCLUDING THE EXTRA REGIONAL BASED COMPETITORS IN INTERNATIONAL AIR FREIGHT TRAFFIC.

ONLY TWO OF THE SEVEN AIRLINES, AVIANCA AND VIASA SHOWED PRE-TAX PROFITS IN 1966 ON THE TOTAL ACCOUNT. THESE TWO AIRLINES ARE BY FAR THE LARGEST CARRIERS OF INTERNATIONAL AIR FREIGHT.

2. The FALAC Airlines

2.1 All the seven FALAC Airlines are carriers of passengers, freight and mail.

2.2 All the FALAC carriers except Viasa are overwhelmingly the major international carriers of their own country, Lan-Chile and Lloyd Boliviana being the sole carriers and Aerolineas Argentinas having 94% of the Argentina airlines international traffic. Much more competition from nationally based carriers is present, however, on domestic routes (See Tables 2.a and 2.b).

It is clear that the domestic markets have rather different importance for different airlines and the FALAC carriers have, for whatever reason, placed different degrees of emphasis on international freight. In freight traffic the international routes have more importance for the FALAC airlines than for the other airlines registered in each country (See Table 2.c).

2.3 The FALAC airlines vary greatly in their size and rate of growth of cargo operators. In international cargo operations there are three distinct sizes of operation.

1. Avianca and Viasa	10 + ('000,000 Tonne-Kms)
2. Aerolineas Argentinas, Lan-Chile, Apsa	3-6 ('000,000 Tonne-Kms)
3. Lab and Ecuatoriana	0-1 ('000,000 Tonne-Kms)

The growth rate of international freight traffic of these airlines are higher than those of domestic traffic for all the airlines (See Table 2.d) and these growth rates range from 8.9 to 70.5 per cent per annum. Hence any estimate of the relative strengths of the airlines must take into account these varying growth rates as well as present traffic.

2.4 Three of the airlines, Equatoriana, Apsa and Viasa are solely international carriers of freight. Aerolineas Argentinas is mainly (68%) international in its cargo traffic; the other three airlines, Lab, Lan-Chile and Avianca are mainly domestic in their freight carrying operations; only 27, 24 and 36% respectively of freight traffic being international.

2.5 Total Industry Traffic

On any world scale, the FALAC carriers are very small in international air freight and their problems are those of small carriers operating extended route networks.

Even the largest of these airlines in freight traffic, Avianca, performing 14.6 million Tonne-Kilometres in 1966, does not compare with the other typical world carriers shown in Table 2.e.

The seven FALAC countries themselves comprise only a small proportion of South American air cargo traffic (the region being dominated by Brazil) and only Colombia has a total system comparable with those of the smaller European countries (See Table 2.f).

2.6 Air cargo carried on airlines registered in South America was, in 1966, 3.95% of world air cargo in tonne-kilometres and whereas the world growth rate has been 286% in the six years 1960-1966,in South America, the comparable growth rate has been only 128%.

However, the international cargo traffic, both world and of these South American registered airlines, has been growing at a much faster rate than domestic traffic. International air cargo in South America has risen from 19% to 46% of total air cargo in the region.

2.7 It has been considered that conditions in South America are especially favourable to international air cargo development but as Table 2.f indicates, South America as a region shows no more growth than Oceana or the Far East, comparable regions in terms of traffic and the latter comparable in terms of economic development.

2.8 This picture also continues down to the level of individual FALAC countries.

This disparity between domestic and international cargo growth is especially marked in the case of Colombia for reasons which will be referred to later.

2.9 Cargo Capacity

All-cargo services in South America provide a small proportion of total international cargo capacity offered. This is true both for FALAC and non-FALAC airlines. International freight in the region is largely carried belly-hold in mixed aircraft. Table 2.g shows capacity figures for sample months on a number of inter-capital sectors. Mixed passenger-cargo aircraft predominate and non-FALAC airlines predominate in this form of capacity. Table 2.h shows that few of the FALAC capitals are directly connected by all-cargo aircraft.

2.10 All the FALAC all-cargo services are operated by obsolescent piston-engined aircraft.

The jet all-cargo scheduled services are operated by non-FALAC airlines, Pan-Am, Braniff, Varig. These services, competition to the FALAC carriers, are of recent growth and are expanding fast. These competitive services are shown also in Figures 2.i and 2.j. Several of the FALAC carriers have plans to purchase all-cargo equipment.

2.11 Most of the international cargo is now carried in mixed passenger-cargo aircraft. Virtually all these international services of the FALAC airlines are now operated by jets as well as an increasing number of domestic services. On the mixed passenger-freight equipment, all but two of the airlines exclusively operate turbo-jet equipment, in common with the extra regional and non-FALAC competitors. These two, LAB and Ecuatoriana operate turbo-prop aircraft.

2.12 Competition

The airlines show a large degree of overlap of international route structures. The patterns of international routes for the airlines are shown in figures 2.a to 2.h together with the route pattern of Braniff, the major competitor.

2.13 Competition between the seven airlines is strong. Table 2.i shows that up to five of the airlines compete on some sectors. Competition however, is much stronger from non-FALAC carriers. Of the sectors listed in Table 2.i, non-FALAC airlines contribute an average of 12.1 frequencies/week and FALAC airlines, 5.9 frequencies/week. This competition comes from a number of carriers, regional and non-regional, of which the strongest is Braniff.

2.14 Administration and Commercial Records

The ownership structures of the seven airlines are entirely different ranging from entirely nationalised companies to entirely privately owned. However, each of the seven airlines, as the national flag carrier, is the vehicle for international air transport policy and has Government support. Integration has two facets: international-political and commercial. Political goodwill is assumed and commercial considerations are examined in the rest of this report.

2.15 The seven airlines have quite dissimilar commercial records in recent years. Only two of the airlines, Avianca and Viasa show a profit-making situation (See Table 2.L). These are the larger carriers. By comparison the major FALAC competitor, Braniff and also Trans-Mediterranean - one of the smaller all-cargo carriers - show profits.

2.16 Many reasons exist for the financial problems of these FALAC airlines. One certainly is scale. These are small airlines with long route networks and very wide responsibilities, having to compete with major carriers on a world scale by operating competitive equipment.

The burdens of capitalising re-equipment are those of all international carriers at this time. Other problems are internal to the seven airlines. There is no doubt that several of the airlines have grave administrative problems. Even in the better-run airlines, it is not clear that sufficient reserves of managerial talent exist to take the airlines through their next stage of growth.

2.17 In many of the airlines, professionalism in flight operation is not matched by other departments.

Although cargo traffic represents 20% of the revenues of the FALAC carriers, none of these carriers can be said to 'market' cargo.

2.18 During this study, it was found that none of the airlines had done any route studies, few had origin-destination cargo traffic statistics, analyses of traffic by commodity did not exist, analysis of the markets did not exist. Similarly no cost accounting of total cargo costs was found in any airline.

2.19 Traffic

One of the dominating features of international air cargo traffic in South America is the directional imbalance. Later sections will describe in detail a South-North imbalance of traffic for most countries of a factor of about 3. This is despite a highly favourable North-South rate structure. This order of directional imbalance is equivalent to that of many African countries.

2.20 There is a wide variation of traffic between different sectors. Table 2.j indicates six sectors with traffic exceeding 200 tonnes in the sample month of March 1967. This Table also indicates the wide variation in growth rates over a period even as short as two years. Also of interest is that market shares of the FALAC airlines are particularly small over the six important sectors.

2.21 The cargo traffic figures of the individual airlines conceal large variations in the mail content of freight and mail. Table 2.k shows that the average proportion of mail is constant at 18.1 per cent, but that Aerolineas Argentinas has nearly 40% of its international cargo traffic as mail.

2.22 Seasonal Variations in Traffic and Capacity

Since a great deal of the northbound and inter-regional traffic is in perishable commodities, seasonal demand is an important factor on certain routes. Hence early season grapes north from Argentina and shellfish north from the northern countries, represents almost entirely seasonal traffic, the seasonality depending on the conjunction of supply and demand fluctuations, largely in the United States and Panama. On routes south from the United States and from Europe, where nearly all trade is in manufactured goods, a pre-Christmas peak is the only major fluctuation.

2.23 Nearly all the freight traffic is carried in passenger aircraft. Seasonal peaks in passenger carryings are dominated by northern hemisphere (mainly United States) holiday traffic. This seasonal peaking is much less than in other regions, but again, offered services follow the variations less than in other regions, resulting in July/August peakings in load factors. However, these low passenger load factors and the small present extent of cargo traffic means that there appears no discernible effect of seasonal capacity restricting freight traffic. Typical seasonal carryings for the year 1966 for one carrier are shown in Figure 2.k.

2.24 General Picture

The picture that emerges is of seven very distinct organisations of different sizes, rates of growth, profitability, resources and aims. The point of commonality, especially route patterns, are largely points of competition.

2.25 One airline, Viasa, has already indicated that it feels the points of difference between itself and the other six airlines are so large that it would be unwilling to co-operate.

2.26 It could well be that a more naturally homogenous grouping of airlines with more in common that even the remaining six would be more realistic. Certainly the surrender of absolute control in this cargo sector on the part of individual airlines, necessary in any integration endeavour, demands a great deal of trust and enthusiasm on the part of participants. At the time of writing this study, the individual airlines, whilst acknowledging that the implications of integration were then unclear to them, had very different degrees of enthusiasm for the project.

2.27 The lesson of previous attempts at integration in the field of transport indicates that commercial community of interest of larger participants with similar aims might well prove stronger than the political community of interest holding together a group of disparate partners. Certainly a smaller group of partners with more in common could be postulated.

2.28 However, it becomes clear that all participants in any grouping of national airlines participating in a FALAC organisation must have strong economic reasons for participation. These economic benefits must be seen to be immediate to the airlines and also to be financial, and not concerned with long-term development of the region although this would be a welcome bonus. That the basic motive of the airlines, in considering cargo integration, is to seek such financial benefits, is shown in their concern with the increasing dominance of the regional cargo field by larger non-regional carriers and by realisation of financial and other economies of scale in countering such loss of market share.

2.29 The concern of the rest of this report is to quantify such benefits and show their relevance to each airline.

Total Scheduled Air Cargo - Seven 'FALAC' Countries
1960 - 1966
Sources: ICAO and IATA

Total Freight Tonne Kilometres Scheduled Services:	1960 '000	1961 '000	1962 '000	1963 '000	1964 '000	1965 '000	1966 '000	1967* '000
Aerolineas Argentinas	6,258	7,023	5,537	6,227	6,561	6,977	7,696	15,484
Other Argentinia	5,895	5,786	1,879	1,454	1,639	1,709	2,549	NA
Total Argentina	12,153	12,809	7,416	7,681	8,200	8,686	10,245	NA
Percentage	51.5%	55%	75%	81%	80%	80%	75%	NA
Lloyd Aereo Boliviana	NA	NA	3,215[13]	1,763	NA	1,136	1,129	NA
Other Bolivia	NA	NA	NA	NA	NA	NA	NA	NA
Total Bolivia	5,606[23]	3,387[3]	3,215[23]	1,763	3,372[2]	NA	NA	NA
Percentage	NA	NA	NA	NA	NA	NA	NA	NA
Lan Chile	5,965	6,931	7,871	9,931	10,791	13,393	13,940	16,663
Other Chile	2,278	8,603	3,414	10,197	12,352	9,992	10,141	NA
Total Chile	8,243	15,534	11,285	20,128	23,143	23,385	24,081	NA
Percentage	72%	45%	70%	49%	47%	57%	58%	NA
Avianca	32,007	31,231	34,845	36,092	38,568	38,239	39,134	43,155
Other Colombia	7,612	9,750	9,293	9,061	15,134	13,624	12,102	NA
Total Colombia	39,619	40,981	44,138	45,153	53,702	51,863	51,236	NA
Percentage	81%	76%	79%	80%	72%	74%	76%	NA
Ecuatoriana	NA	NA	350[1]	325[1]	NA	875	864	NA
Other Ecuador	NA	NA	595[1]	630[1]	NA	1,156[2]	1,465[2]	NA
Total Ecuador	895[1]	925[1]	945[1]	955[1]	930[1]	2,031[2]	2,329[2]	NA
Percentage	-	-	37%	34%	-	43%	37%	NA
Apsa	NA	NA	1,705[1]	1,865[1]	845[4]	2,615	3,929	5,476
Other Peru	NA	NA	3,730[1]	3,925[1]	8,305	7,635	7,575	NA
Total Peru	6,705[13]	6,650[13]	5,435[13]	5,790[1]	9,150[1]	10,250[1]	11,504[2]	NA
Percentage	-	-	31%	32%	(9)%	26%	34%	NA
Viasa	NA	1,937	5,189	5,307	5,636	8,237	10,559	NA
Other Venezuela	NA	20,444	24,494	30,192	36,543	40,372	21,996	NA
Total Venezuela	10,807	22,381	29,683	35,499	42,179	48,609	32,555	NA
Percentage	-	9%	17%	15%	13%	17%	32%	NA

Key to Footnotes

1 = Estimated by ICAO
2 = Provisional Data
3 = Includes non-scheduled flights
4 = Figures do not cover complete years operations
NA = Not available
* = Where available

International Scheduled Air Cargo - Seven 'FALAC' Countries
1960 - 1966
Sources: ICAO and IATA

Total Freight Tonne Kilometres Scheduled Services:	1960	1961	1962	1963	1964	1965	1966	1967*
Aerolineas Argentinas	2,802	3,329	3,020	3,868	3,656	4,275	5,345	12,398
Other Argentinia	4,351	4,375	786	442	200	250	368	NA
Total Argentinia	7,153	7,704	3,806	4,310	3,856	4,525	5,713	NA
Percentage	39%	43%	79%	90%	95%	94%	94%	NA
Lloyd Aereo Boliviana	-	-	945[13]	442	-	278	273[4]	NA
Other Bolivia	-	-	-	-	-	-	-	NA
Total Bolivia	300[1]	565[1]	945[13]	442	470[1]	278	273	NA
Percentage	-	-	100	100	-	100	100	NA
Lan Chile	2,006	2,999	3,316	3,832	2,495	3,145	3,415	5,609
Other Chile	1,500	5,165	-	-	-	-	-	NA
Total Chile	3,506[2]	8,164[2]	3,316	3,832[2]	2,495	3,145	3,415	NA
Percentage	57%	37%	100%	100%	100%	100%	100%	NA
Avianca	2,637	3,740	4,501	7,453	9,367	11,991	14,417	14,328
Other Colombia	1,814	2,201	1,710	1,180	2,636	2,061	3,002	NA
Total Colombia	4,451	5,941	6,211	8,633	12,003[2]	14,052	17,419	NA
Percentage	59%	63%	72%	86%	78%	85%	83%	NA
Ecuatoriana	-	-	290[1]	260[1]	-	875	860	NA
Other Ecuador	-	-	-	-	-	132	255	NA
Total Ecuador	260[1]	285[1]	290[1]	260[1]	230[1]	1,007	1,115[2]	NA
Percentage	-	-	100%	100%	-	87%	77%	NA
Apsa	-	-	775	895	845	2,613	3,929	5,476
Other Peru	-	-	-	920	2,725	1,947	2,000	NA
Total Peru	510	755	775	1,815	3,570	4,560	5,929	NA
Percentage	-	-	100%	50%	24%	57%	66%	NA
Viasa	-	1,937	5,189	5,307	5,636	8,237	10,559	NA
Other Venezuela	-	16,094	19,617	25,021	30,983	35,087	16,614	NA
Total Venezeula	6,721[2]	18,031	24,806	30,328	36,619	43,324	27,173	NA
Percentage	-	11%	21%	17%	15%	19%	39%	NA

Key to Footnotes

1 - Estimated by ICAO
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4 - Figures not covering a complete years operatio
NA - Not available

Distribution of International to Total Scheduled Air Freight in FALAC countries and FALAC Airlines

(Tonne-kms '000,000)

	Total freight tn-kls	1960 International freight	% of total	Total freight	1966 International freight	% of total	Airline	Total freight	1960 International freight	% of total	Total freight tns-kls	1966 International freight	% of total
a	12.2	7.2	59	10.2	5.7	55	Aerolineas	6.3	2.8	44	7.7	5.3	68
	5.6	0.3	5	1.1	0.3	27	Lab	-	-	x100	1.1	0.3	27
	8.2	3.5	43	24.1	3.4	14	Lan	6.0	2.0	33	13.9	3.4	24
	39.6	4.5	11	51.2	17.4	33	Avianca	32	2.6	8	39	14.4	36
	0.895	0.3	34	2.3	1.1	47	Cea	-	-	x100	0.9	0.9	100
	6.7	0.5	7	11.5	5.9	51	Apsa	-	-	x100	3.9	3.9	100
a	10.8	6.7	62	32.6	27.2	83	Viasa	-	-	x100	10.6	10.6	100

Source: ICAO

Table 2.c

Average annual rate of growth % in Freight (ex mail) traffic

	Domestic 1965-1967	International 1965-1967
Aerolineas Argentinas	• 8.3	• 70.5
Avianca	• 4.8	• 8.9
Lan Chile	• 4.8	• 29.2
Viasa (1965-1966)	-	• 13.2
Apsa	-	• 44.8

Source: IATA

Average annual rate of growth % in freight (ex mail) traffic

ICAO reporting airlines registered in:-	Domestic 1957-1962 % p.a.	Domestic 1962-1966 % p.a.	International 1957-1962 % p.a.	International 1962-1966 % p.a.
Argentina	• 7.2	• 5.8	• 16.0	• 10.7
Bolivia	• 4.6	• 21.7	• 57.0	• 26.7
Chile	• 0.2	• 26.9	• 11.6	• 0.7
Colombia	• 1.7	• 2.8	• 7.0	• 29.4
Ecuador	• 88.8	• 16.2	• 590.0	• 40.0
Peru	• 3.4	• 11.3	• 62.0	• 66.3
Venezeula	• 0.4	• 2.5	• 48.3	• 2.3

Source: ICAO

Distribution of International to Total Scheduled Air Cargo Traffic (Tonne-kms '000,000) for Representative World Airlines.

Airline	1960			1966		
	Total	International	% of Total	Total	International	% of Total
PAA	196.7	196.7	100	724	541.7	74.8
KLM	99.6	99.6	100	223	223	100
BOAC	62.2	62.2	100	262	262	100
SAS	41.6	40.7	97	104	101.5	97.6
Air France	76.4	39.4	51	175	167	95.4
QEA	38.8	37.9	97	85.9	85.8	99.9
Seaboard	35.9	35.9	100	140.2	140.2	100
DLH	29.9	28.7	95	186.6	182	97.5
Swissair	27.4	27.2	99	68.2	67.9	99.6
TWA	103.0	25.8	25	374.3	122.5	32.7
Sabena	33.3	24.2	72	63.6	63.6	100
BEA	-	19.5	-	59.4	45.6	76.8
Alitalia	-	17.5	-	122.5	116.7	95
Northwest	47.4	16.4	34	15.9	74.9	47
All	-	15.9	-	-	-	-
JAL	-	12.5	-	108.2	97	89
TCA	30.4	10.7	35	1.5	0.191	12
TMA	-	9.7	-	27.1	27.1	100
Panagra	-	9.6	-	22.9	22.9	100
Silver City	-	9.2	-	-	-	-

Distribution of International to Total Scheduled Air Freight Traffic

(Tonne-km '000,000)

By Region and Country

Country	1960			1966		
	Total Freight	International Freight	% of total	Total Freight	International Freight	% of total
United States	1026.1	330.4	32	3,139.6	928.0	29
United Kingdom	122.0	114.2	93	378.0	354.9	93
Netherlands	99.9	99.6	99	223.4	223.1	99
France	113.8	49.5	43	216.5	207.5	95
Scandinavia	44.0	40.7	92	107.3	101.5	94
Australia	81.4	37.9	48	145.2	85.8	59
Germany	-	28.7	-	186.6	182.	97
Switzerland	-	27.2	-	68.2	67.9	99
Belgium	33.3	24.2	72	63.6	63.6	100
Italy	-	17.5	-	122.8	116.7	95
Other Countries	360.4	200.1	55	-	-	-
Region						
Europe	495	415	83	1,521,1	1,452.2	95.5
North America	1,130	-	33	3,431.6	1,068.0	31.2
Oceana	95	40	42	169.2	94.3	55.7
Far East	80	40	50	278.9	195.5	70.1
South America	180	35	19	231.6	106.3	46.0
Middle East	40	35	87	90.6	83.5	92.0
Africa	40	25	62	137.1	110.4	80.6

Table 2.f

FROM	TO	FALAC Airlines		Non - FALAC Airlines	
		March 1965	March 1967	March 1965	March 1967
Buenos Aires	Santiago	199	197	1,275	1,474
Santiago	Lima	117	332	620	774
Lima	Guayaquil	61	299	415	552
Bogata	Caracas	93	210	336	389
Bogata	Miami	226	443	89	113
Bogata	Panama	126	115	271	136
Caracas	New York	46	129	298	646
La Paz	Lima	33	-	-	-

FROM	TO	FALAC Airlines		Non - FALAC Airlines	
		March 1965	March 1967	March 1965	March 1967
Buenos Aires	Santiago	-	-	15	170
Santiago	Lima	-	11	15	-
Lima	Guayaquil	-	-	30	-
Guayaquil	Bogata	-	-	-	-
Bogata	Caracas	-	-	-	-
Bogata	Miami	-	-	18	-
Caracas	Miami	-	-	150	-
Bogata	Panama	-	-	-	-
Panama	Miami	-	-	-	-
Caracas	New York	-	-	227	-

Capacity Offered

South-Bound — Total Capacity - Mixed Passenger/Cargo Aircraft (A)

TO	FROM	FALAC Airlines		Non - FALAC Airlines	
		March 1965	March 1967	March 1965	March 1967
Santiago	Buenos Aires	199	303	1,304	1,248
Lima	Santiago	108	344	611	715
Lima	La Paz	47	-	-	-
Guayaquil	Lima	79	309	447	639
Bogata	Guayaquil	-	-	-	-
Caracas	Bogata	187	196	302	357

South-Bound — Total Capacity on All-Cargo Services (B)

TO	FROM	FALAC Airlines		Non - FALAC Airlines	
		March 1965	March 1967	March 1965	March 1967
Santiago	Buenos Aires	-	-	-	158
Lima	Santiago	-	-	-	158
Guayaquil	Lima	-	-	-	-
Bogata	Guayaquil	-	-	-	-
Caracus	Bogata	-	-	-	-

Weekly International Frequencies All Cargo through Services and Types between Main 'FALAC' Centres and Miami.

FROM \ TO	Buenos Aires	La Paz	Santiago	Bogota	Barranquilla	Quito	Guyaquil	Lima	Caracas	Miami
Buenos Aires			1B7			1B7		1B7	1B7	1B7
La Paz	1B7									
Santiago						1B7	1D6	1B6 1D6		1B7 1D6
Bogota										3D4
Barranquilla										3D4
Quito										1B7
Guyaquil			1D6					1D6		1D6
Lima	1B7	1B7	1D6			1B7	1D6			1B7 1D6
Caracas										5B7
Miami	1B7	1B7	1D6	3D4	2D4		1D6	1D6 1B7	6B7	

B7 - Boeing 707
D6 - DC 6
D4 - DC 4/C 54
BG - Boeing 720

1D6 - FALAC Airlines

Source: 'ABC World Airways Guide' February 1969.

Table 2.h

Table 2.h

Duplication of mixed Passenger - Cargo services on Inter-Capital Air Routes.

Direct Services (whether Non-Stop or not) February 1969 -

From	To	Number of Airlines Operating Direct Services	Airlines Operating Direct Service	Total Frequencies Per Week	FALAC Frequencies
Bogota	Buenos Aires	3	(AR).(AV).(EP).	7	7
	Caracas	3	(AV).IB.(VA).	7	4
	La Paz	2	IB.LH.	2	0
	Lima	8	(AR.(EP).IB.AF.(AV).LH.(VA).RG.	19	10
	Quito	4	IB.RE.AF.(AV).	9	3
	Santiago	5	(EP).IB.AF.(AV).LH.	10	5
	Miami	5	(AV).BN.OD.RE.(EP).	23	11
Buenos Aires	Caracas	1	P.A.	1	0
	La Paz	3	(LB).(AR).BN.	5	3
	Lima	7	(AV).(AR).(BB).(EP).BN.(LA).CP	30	20
	Quito	1	(AV).	1	1
	Santiago	15	(AR).(AV).(EP).BN.LH.AF.RG.(LA). IB.BR.SK.SR.KL.CP.AZ.	45	24
	Miami	6	(AV).(EP).BN.(AR).(LA).PA.	23	12
Caracas	La Paz	1	IB.	1	0
	Lima	5	IB.KL.AZ.(AV).(VA).	10	2
	Quito	3	IB.AF.(AV).	4	1
	Santiago	3	IB.AF.(AV).	6	1
	Miami	5	RG.KL.LM.PA.(VA).	15	5
La Paz	Lima	4	BN.LH.IB.(LB).	10	2
	Quito	2	BN.LB.	2	0
	Santiago	3	LH.BN.IB.	3	0
	Miami	2	BN.PA.	3	0
Lima	Quito	5	EV.(AV).BN.AF.IB.	10	1
	Santiago	10	(EP.LH.(AR).BN.CP.(LA).EV.IB.(AV). AF.	38	19
	Miami	7	(LA).BN.PA.EU.(AV).(EP).(AR).	36	18
Quito	Santiago	4	BN.EU.IB.AF.	7	0
	Miami	5	EU.(AV).BN.PA.RE.	16	3
Santiago	Miami	7	EU.(LA).(AV).(EP).BN.(AR).PA.	25	15
				13.1	5.9 Average

Source: ABC World Airways Guide

Table 2.i

Summary of Main Cargo Traffic Flows - Freight Tonnages by Sector. (Metric Tonnes)
Sample Months - March 1965 and 1967 Scheduled Services

Sector	Direct Distance KM	FALAC Airlines AR 3/65	AR 3/67	AV 3/65	AV 3/67	EP 3/65	EP 3/67	EV 3/65	EV 3/67	LA 3/65	LA 3/67	LB 3/65	LB 3/67	VA 3/65	VA 3/67	All other Latin American 3/65	All other Latin American 3/67	All North American 3/65	All North American 3/67	Other 3/65	Other 3/67	Total 3/65	Total 3/67	FALAC Total 3/65	FALAC Total 3/67	%FALAC 3/65	%FALAC 3/67
Caracas-Bogota	1119	-	-	8	12	-	-	-	-	-	-	-	-	11	10	-	-	-	-	88	5	107	27	19	22	17.8	82
Bogota-Caracas	1119	-	-	8	13	-	-	-	-	-	-	-	-	-	4	-	-	-	-	54	37	62	54	8	17	13	31.5
Bogota-Quito	752	-	-	25	9	-	-	-	-	-	-	-	-	-	-	-	8	-	-	3	38	28	53	25	9	89	17
Quito-Bogota	752	-	-	13	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	27	26	9	13	9	50	100
Quito-Guayaquil Guayaquil-Quito Guayaquil-Lima	1166	-	-	2	0	-	12	-	-	-	18	-	-	-	-	3	2	64	32	14	30	83	94	2	18	2.4	19.1
Lima-Guayaquil	1166	-	-	1	-	-	1	-	-	-	7	-	-	-	-	1	-	37	15	7	4	46	50	1	8	2.2	16
Lima-Antofagasta Antofagasta-Lima Lima-Santiago	2463	-	-	-	-	-	6	-	-	13	18	-	-	-	-	-	-	42	84	5	18	60	126	13	24	21.7	19
Santiago-Lima	2463	-	-	-	-	-	25	-	-	9	22	-	-	-	-	-	-	50	262	68	118	127	327	9	47	7.1	14.4
Mendoza-Santiago	193	1	0	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	3	0	3	0	100	-
Santiago-Mendoza	193	1	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	1	0	1	0	100	-
Santiago-Buenos Aires	1129	-	-	-	-	-	4	-	-	3	4	-	-	-	-	-	28	28	50	24	94	55	181	3	8	5.5	4.4
Buenos-Aires- Santiago	1129	-	-	-	-	-	26	-	-	8	6	-	-	-	-	-	12	56	273	120	178	182	495	8	32	4.4	6.5
Buenos Aires-Montevideo	224	0	4	-	-	-	-	-	-	1	1	-	-	-	-	15	120	12	6	10	126	38	257	1	5	2.6	1.9
Montevideo-Buenos Aires	224	1	-	-	-	-	-	-	-	1	1	-	-	-	-	17	82	26	46	78	113	123	242	2	1	1.6	0.4
Buenos Aires-Asuncion	1065	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26	29	-	-	26	29	0	0	0	0
Asuncion-Buenos Aires	1065	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	3	-	-	13	3	0	0	0	0
Buenos Aires-Rio de Janeiro	1996	6	51	-	-	-	-	-	-	-	-	-	-	-	-	-	14	5	-	1	123	12	188	6	51	50	27.2
Rio de Janeiro-Buenos Aires	1996	13	24	-	-	-	-	-	-	-	-	-	-	-	-	-	9	5	-	45	123	63	156	13	24	20.6	15.4
Caracas-Asuncion Asuncion-Caracas Bogota-Miami	2515	-	-	8	15	-	-	-	-	9	-	-	-	-	-	2	3	6	5	-	-	16	23	8	15	50	65
Miami-Bogota	2515	-	-	27	39	-	-	-	-	-	-	-	-	-	-	-	-	5	9	-	-	32	48	27	39	84.5	81
Miami-New York	1836	-	-	3	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	6	3	6	100	100
New York-Miami	1836	-	-	22	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22	31	22	31	100	100
Caracas-Miami	2120	-	-	-	-	-	-	-	-	-	-	-	-	-	1	11	16	10	78	-	-	21	95	1	11	4.8	11.6
Miami-Caracas	2120	-	-	-	-	-	-	-	-	-	-	-	-	-	10	90	31	-	223	-	-	90	264	10	90	11.1	34
Caracas-Panama		-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	29	60	-	-	31	60	2	-	6.5	0
Panama-Caracas		-	-	-	-	-	-	-	-	-	-	-	-	-	-	55	-	44	115	-	-	99	115	-	-	0	0
Bogota-Panama	793	-	-	30	16	-	2	-	-	-	-	-	-	-	-	9	11	15	-	-	-	54	29	30	18	55.5	62
Panama-Bogota	793	-	-	50	17	-	12	-	-	-	-	-	-	-	-	6	16	16	-	-	-	72	45	50	29	69.5	64.5
Buenos Aires-Lima	3141	-	20	35	62	-	15	-	-	-	-	-	-	-	-	-	-	17	27	-	26	52	150	35	97	67	64.5
Lima-Buenos Aires	3141	-	6	10	9	-	-	-	-	-	-	-	-	-	-	-	-	12	1	-	1	22	17	10	15	45.5	88
Buenos Aires-Santa Cruz	2008	-	NA	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	2	0	2	0	100	-
Santa Cruz-Buenos Aires	2008	x	NA	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bogota-Lima	2099	6	46	9	48	-	13	-	-	-	-	-	-	10	35	6	11	-	67	82	81	114	301	25	142	22	47
Lima-Bogota	2099	x	10	0	10	-	-	-	-	-	-	-	-	8	1	8	11	-	3	114	12	130	47	8	21	61.5	45

Airline Traffic AR - Aerolineas Argentinas AV - Avianca (Colombia) EP - Apsa Peia EU - Ecuatoriana Ecuador LA - Lan Chile LB - Lloyd Aereo Boliviano

VA - Viasa Venezuela

Mail Carried as Proportion of Total Freight and Mail on International Scheduled Services (Tonne-Km)

Airline	1965	1966
	Mail/Freight and Mail	
Aerolineas Argentinas	43.2	37.9
LAB (Bolivia)	2.9	3.85
LAN (Chile)	9.9	13.0
Avianca (Colombia)	10.8	11.5
CEA (Ecuador)	9.9	10.8
Apsa (Peru)	14.5	13.0
Viasa (Venezuela)	13.3	11.7
Average	18.1	18.1

Table 2.k

Profit and Loss of FALAC Airlines (U.S. Dollars '000)
and Braniff International Trans-Mediterranean Airways

	Aerolineas Argentinas		Aerolineas Peruanas		Avianca		Ecuatoriana		Lan Chile		Lloyd		Viasa	
	1965	1967	1965	1967	1965	1967	1965	1967	1965	1967	1965	1967	1965	1967
Total Operating Revenues	-	38,537	13,736	19,402	40,325	51,177	3,172	4,788	15,126	17,482	-	-	24,245	32,942
Total Operating Expenses	-	51,588	14,063	19,235	40,016	49,995	2,977	4,518	18,556	21,399	-	-	22,271	31,969
Operating Result	-	-13,051	-327	+166	+309	+1,182	+196	+269	-3,430	-3,907	-	-	+1,974	+973
Non-Operating Items	-	+ 5,640	+240	-485	+893	+986	-156	-292	+2,351	+1,874	-	-	-	+2,321
Pre-Tax Profit	-	-7,411	-86	-319	+1,202	+2,168	-40	-22	-1,079	-2,033	-	-	+1,974	+3,294

	Panagra	Braniff International		Trans Mediterranean Airways	
	1965	1965	1967	1965	1967
Total Operating Revenues	24,192	16,774	88,866	7,432	13,098
Total Operating Expenses	23,381	16,372	77,315	6,940	12,660
Operating Result	+810	+401	+11,551	+492	+438
Non-Operating Items	+111	-67	-3,830	-76	-258
Pre-Tax Profit	+921	+334	+7,721	+416	+180

Source ICAO Digest 136 1967
Series 21
Series 19 1965

Table 2.L

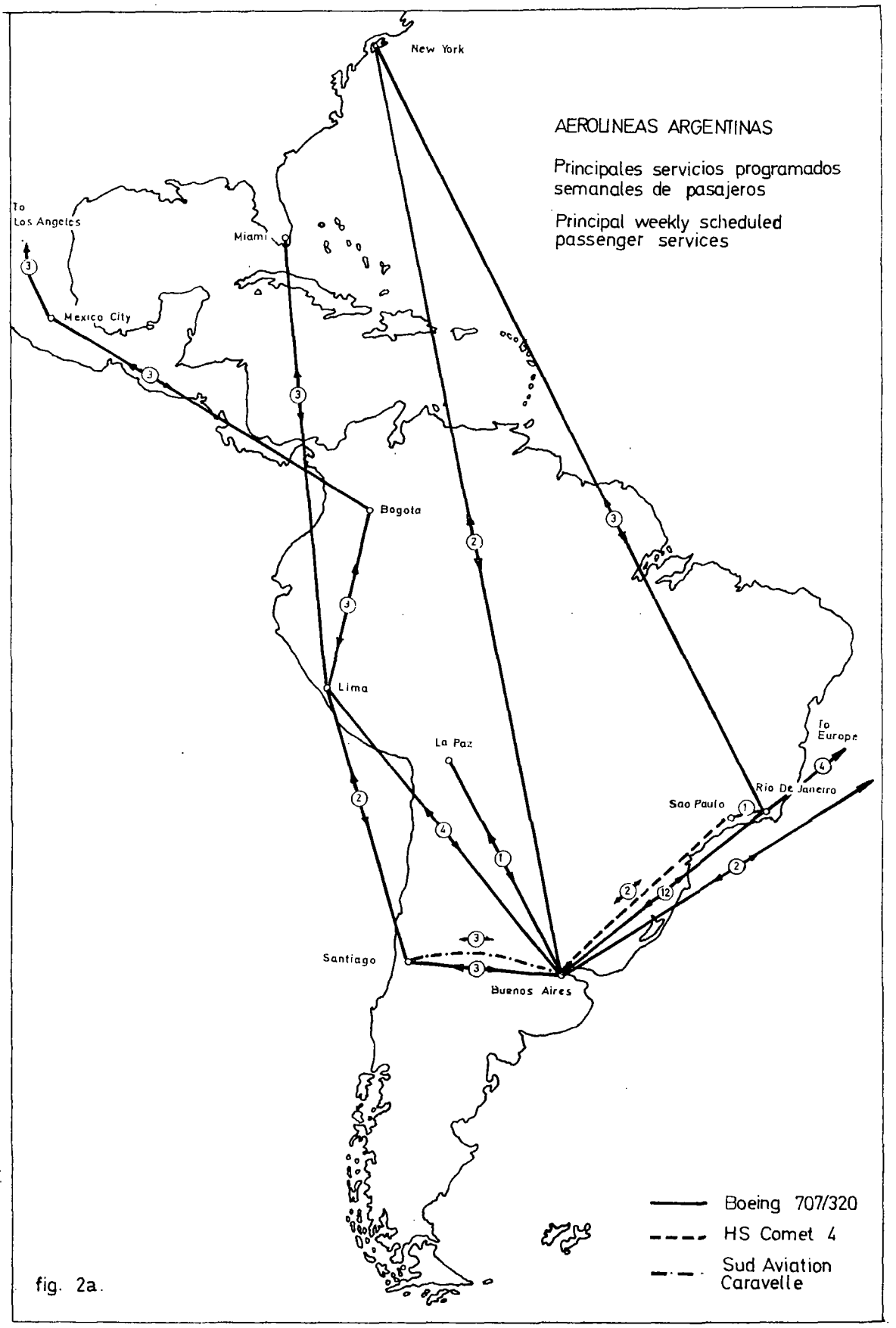

AEROLINEAS ARGENTINAS
Principales servicios programados semanales de pasajeros
Principal weekly scheduled passenger services
New York
To Los Angeles
Miami
Mexico City
Bogota
Lima
La Paz
Santiago
Buenos Aires
Sao Paulo
Rio De Janeiro
To Europe
Boeing 707/320
HS Comet 4
Sud Aviation Caravelle

fig. 2a.

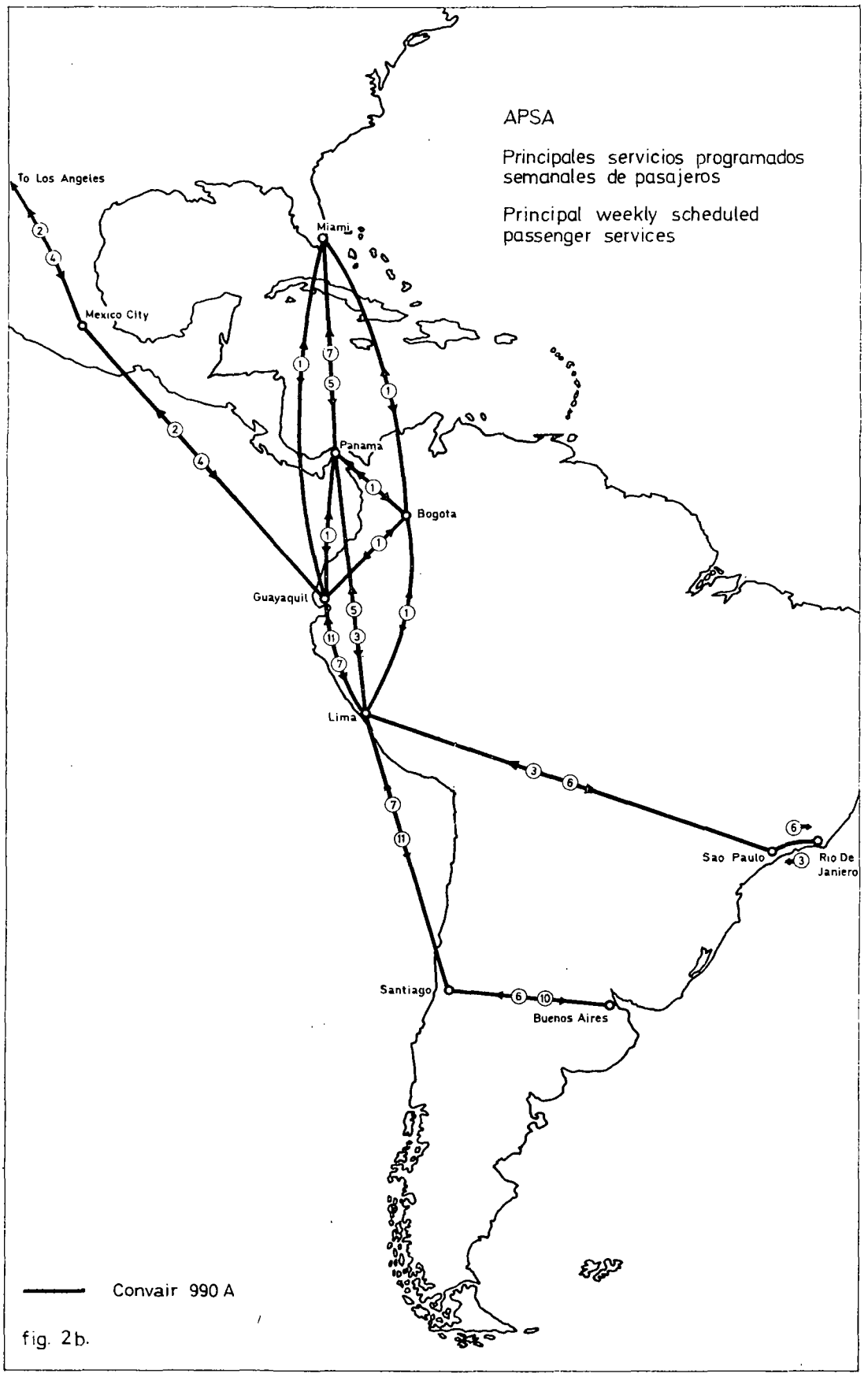

APSA
Principales servicios programados semanales de pasajeros
Principal weekly scheduled passenger services
To Los Angeles
Miami
Mexico City
Panama
Bogota
Guayaquil
Lima
Sao Paulo
Rio De Janiero
Santiago
Buenos Aires
Convair 990 A

fig. 2b.

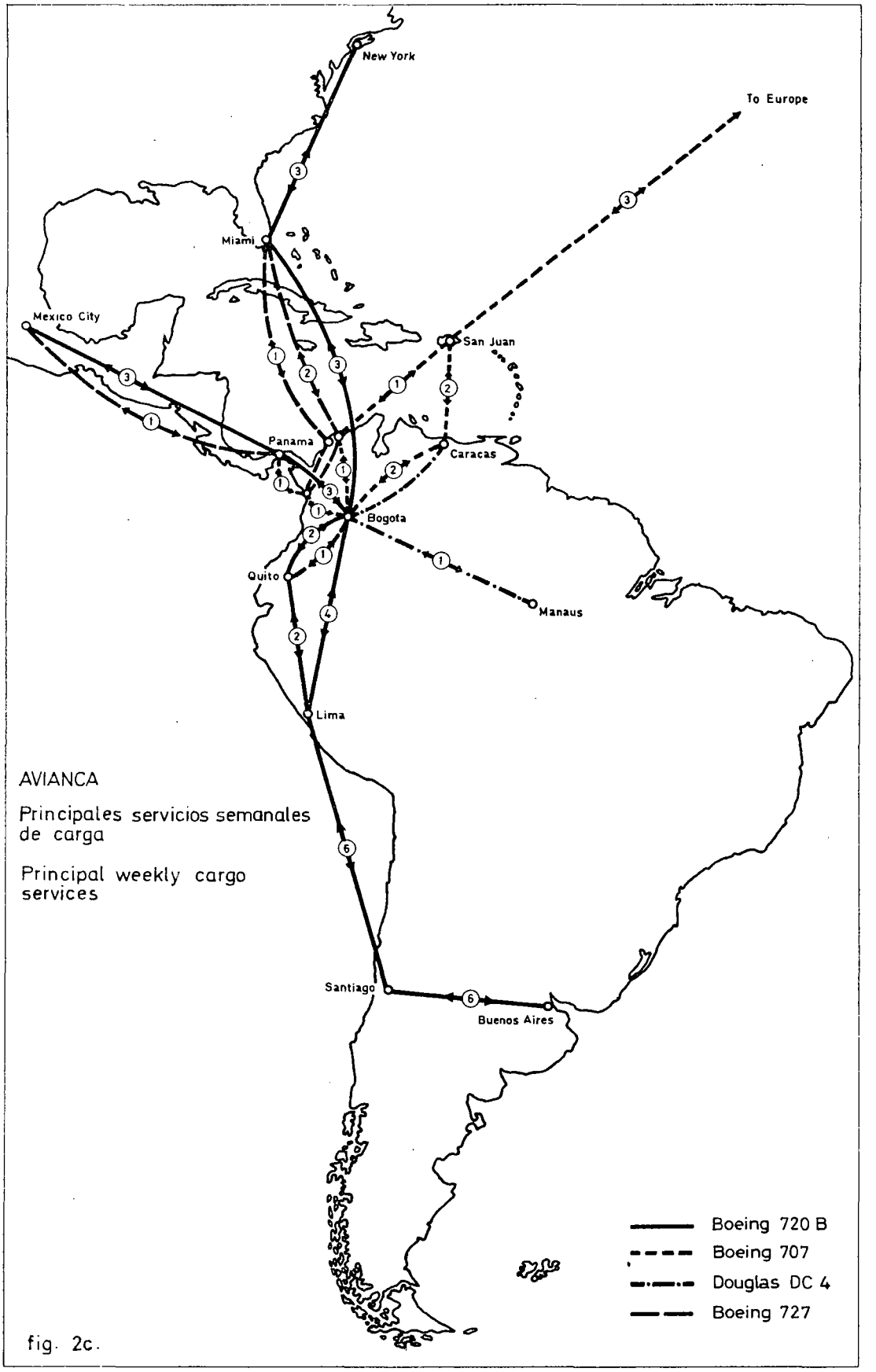

New York
To Europe
Miami
Mexico City
San Juan
Panama
Caracas
Bogota
Quito
Manaus
Lima
Santiago
Buenos Aires
AVIANCA
Principales servicios semanales de carga
Principal weekly cargo services
Boeing 720 B
Boeing 707
Douglas DC 4
Boeing 727

fig. 2c.


ECUATORIANA
Principales servicios programados semanales de pasajeros
Principal weekly scheduled passenger services
Miami
Mexico City
San Salvador
Panama
Cali
Quito
Guayaquil
Lima
Santiago
5
2
5
5
7
7
7
Electra 2

fig. 2d.

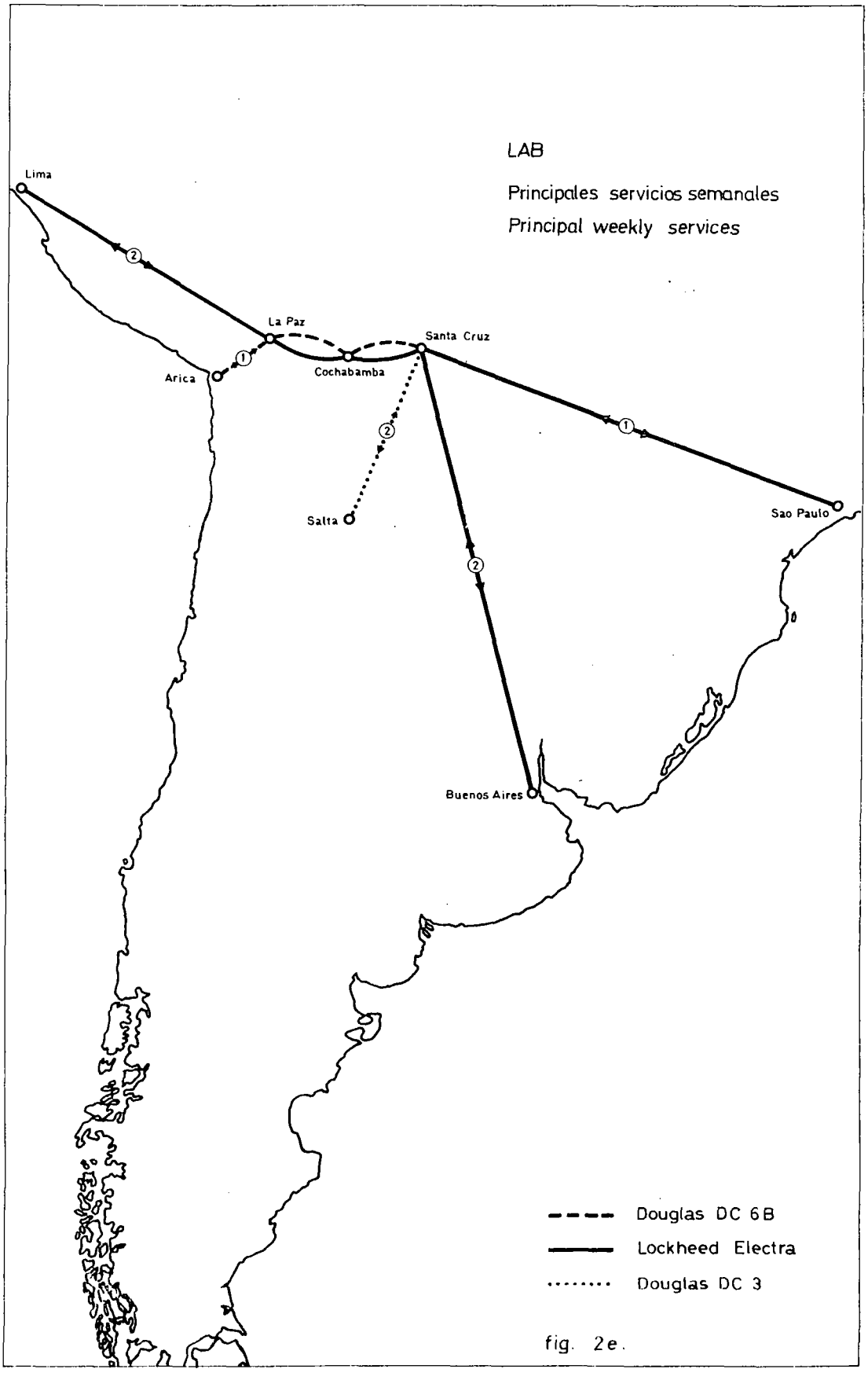

LAB
Principales servicios semanales
Principal weekly services
Lima
La Paz
Santa Cruz
Arica
Cochabamba
Salta
Sao Paulo
Buenos Aires
Douglas DC 6B
Lockheed Electra
Douglas DC 3

fig. 2e.

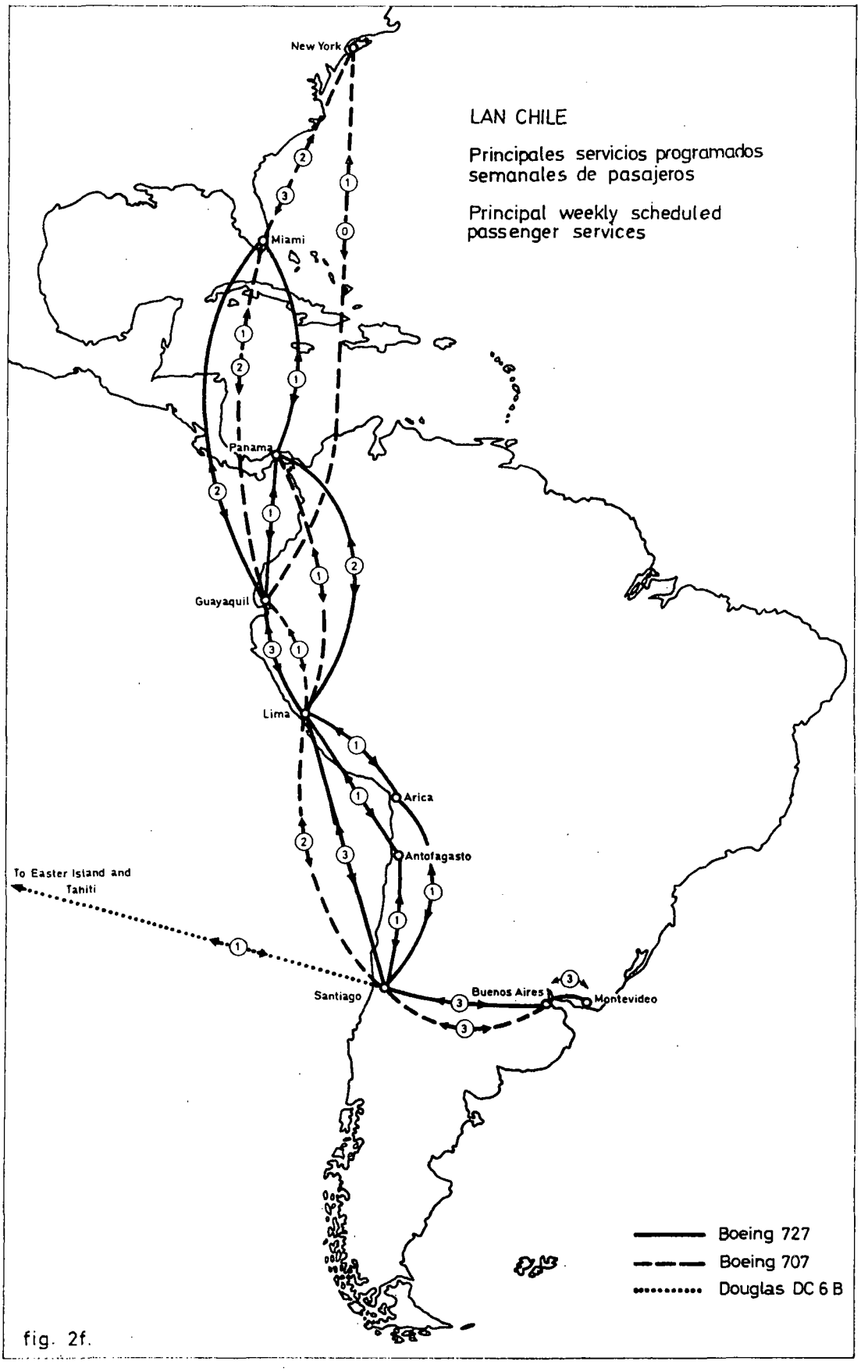

LAN CHILE
Principales servicios programados semanales de pasajeros
Principal weekly scheduled passenger services
New York
Miami
Panama
Guayaquil
Lima
Arica
Antofagasto
To Easter Island and Tahiti
Santiago
Buenos Aires
Montevideo
Boeing 727
Boeing 707
Douglas DC 6 B

fig. 2f.

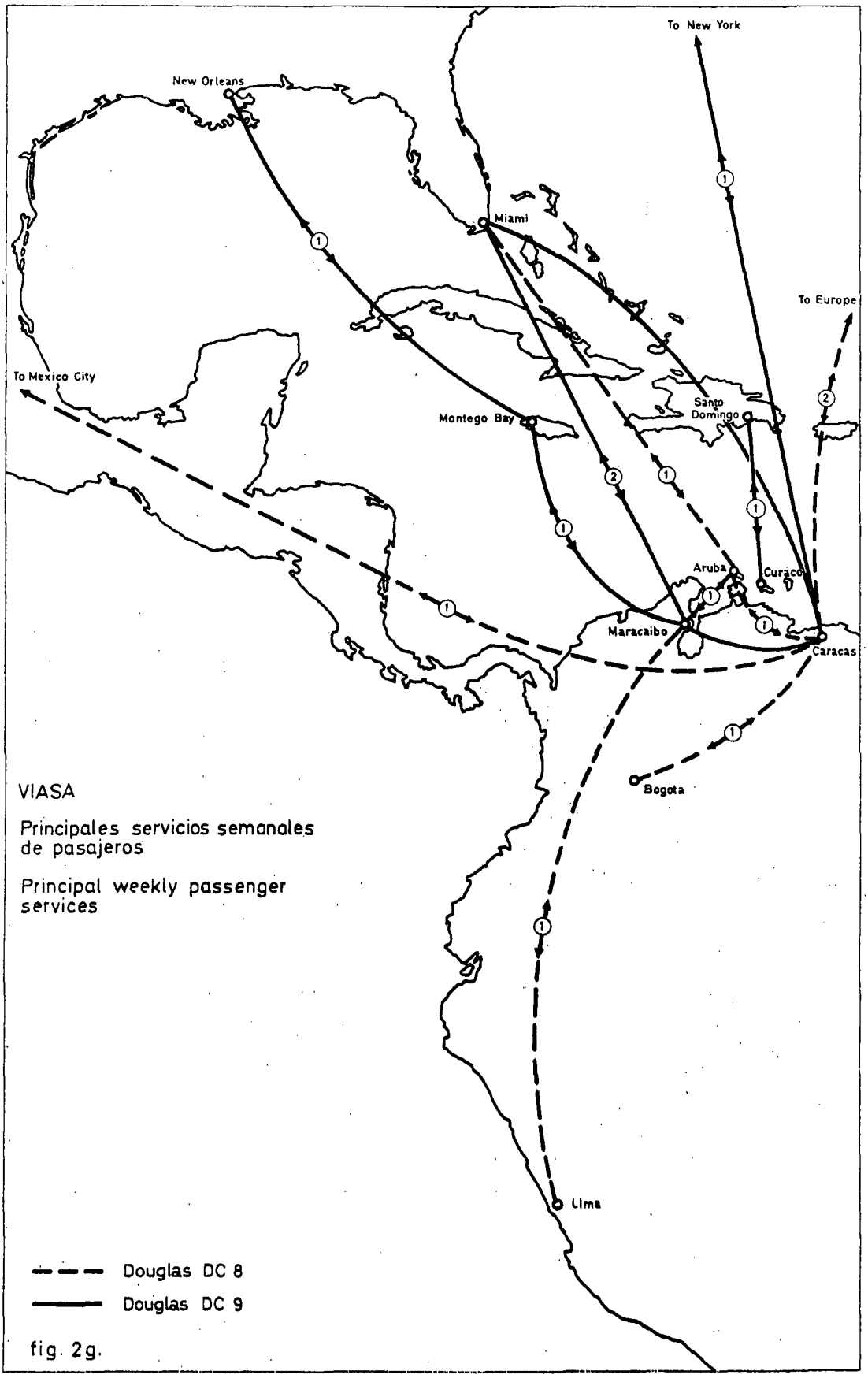

To New York
New Orleans
Miami
To Europe
To Mexico City
Santo Domingo
Montego Bay
Aruba
Curaçao
Maracaibo
Caracas
Bogota
Lima
VIASA
Principales servicios semanales de pasajeros
Principal weekly passenger services
Douglas DC 8
Douglas DC 9

fig. 2g.

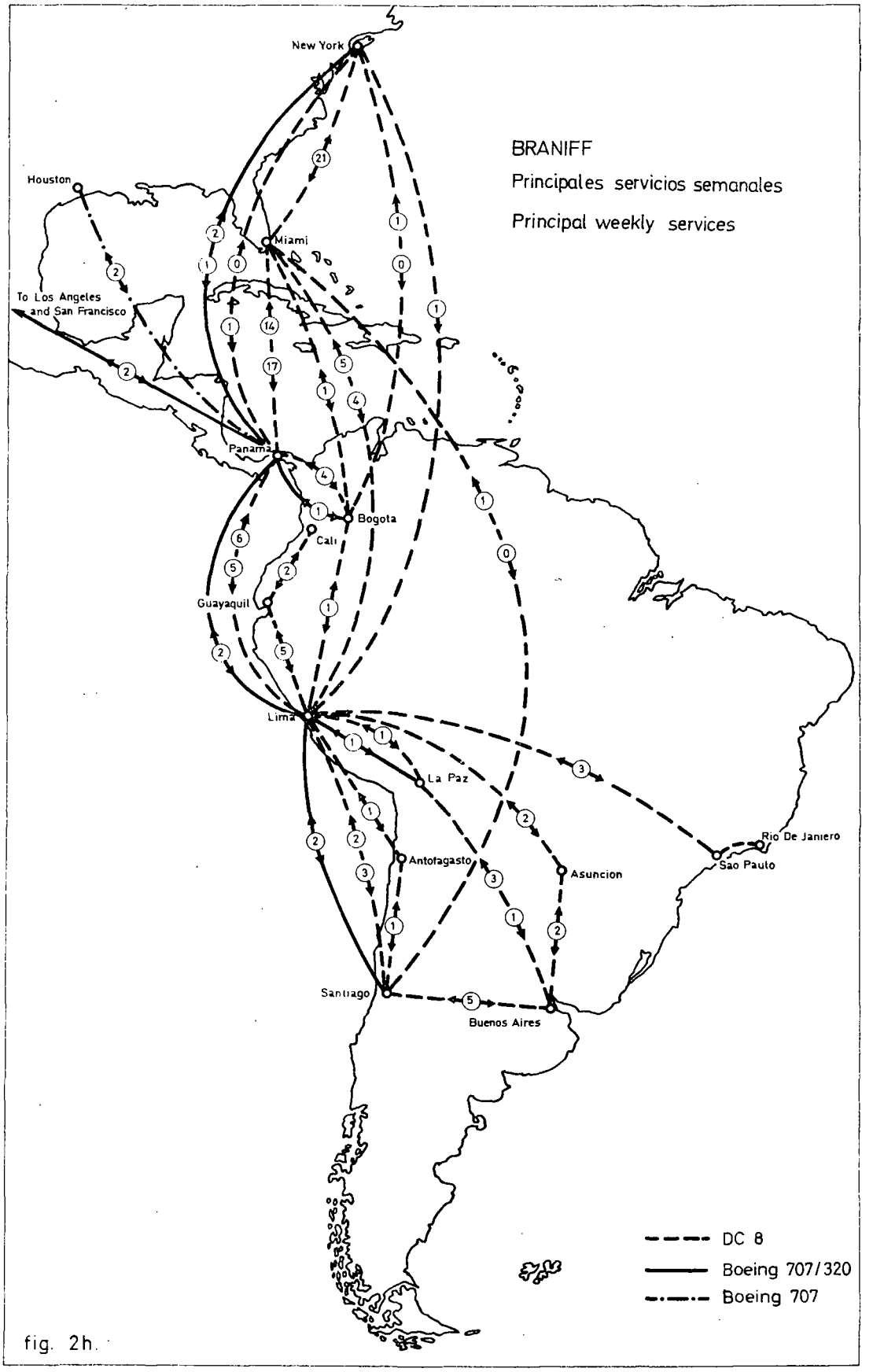

BRANIFF
Principales servicios semanales
Principal weekly services
New York
Houston
Miami
To Los Angeles
and San Francisco
Panama
Bogota
Cali
Guayaquil
Lima
La Paz
Antofagasto
Asuncion
Rio De Janiero
Sao Paulo
Santiago
Buenos Aires
DC 8
Boeing 707/320
Boeing 707

fig. 2h.

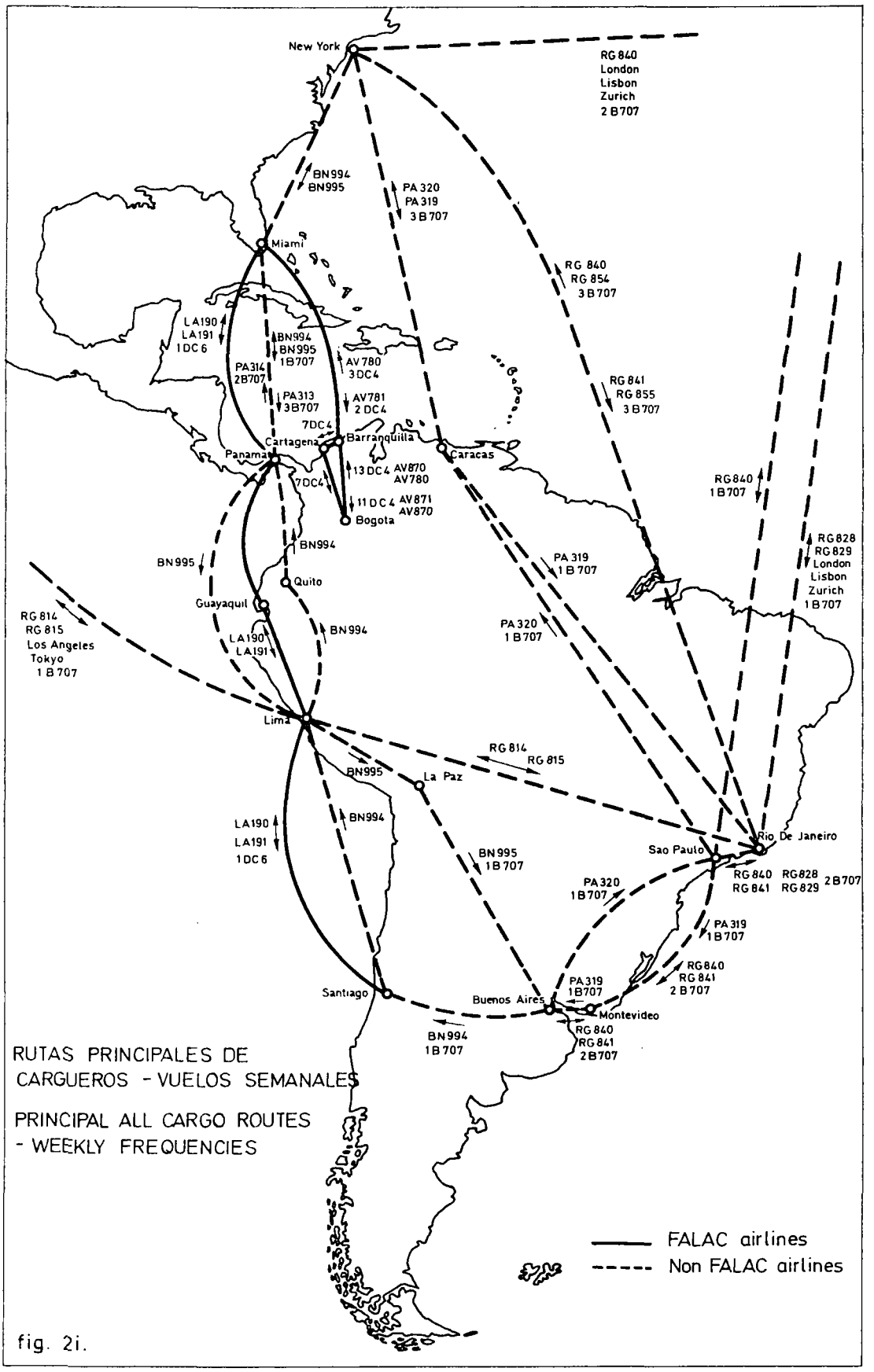

New York
RG 840
London
Lisbon
Zurich
2 B707
BN994
BN995
PA 320
PA 319
3 B707
Miami
RG 840
RG 854
3 B707
LA190
LA191
1 DC6
BN994
BN995
1B707
PA314
2B707
AV 780
3 DC4
PA313
3B707
AV781
2 DC4
7DC4
Cartagena
Barranquilla
Caracas
RG 841
RG 855
3 B707
Panama
7DC4
13 DC4
AV870
AV780
11 DC4
AV871
AV870
Bogota
RG840
1B707
RG828
RG829
London
Lisbon
Zurich
1B707
BN994
BN995
Quito
PA 319
1 B 707
Guayaquil
RG 814
RG 815
Los Angeles
Tokyo
1 B 707
LA190
LA191
BN994
PA 320
1 B 707
Lima
RG 814
RG 815
BN995
La Paz
LA190
LA191
1DC6
BN994
BN995
1B707
Rio De Janeiro
Sao Paulo
RG 840
RG 841
RG828
RG829
2B707
PA320
1B707
PA 319
1B707
RG840
RG 841
2 B707
Santiago
Buenos Aires
PA319
1B707
Montevideo
BN994
1B707
RG 840
RG 841
2B707
RUTAS PRINCIPALES DE
CARGUEROS - VUELOS SEMANALES
PRINCIPAL ALL CARGO ROUTES
- WEEKLY FREQUENCIES
FALAC airlines
Non FALAC airlines

fig. 2i.

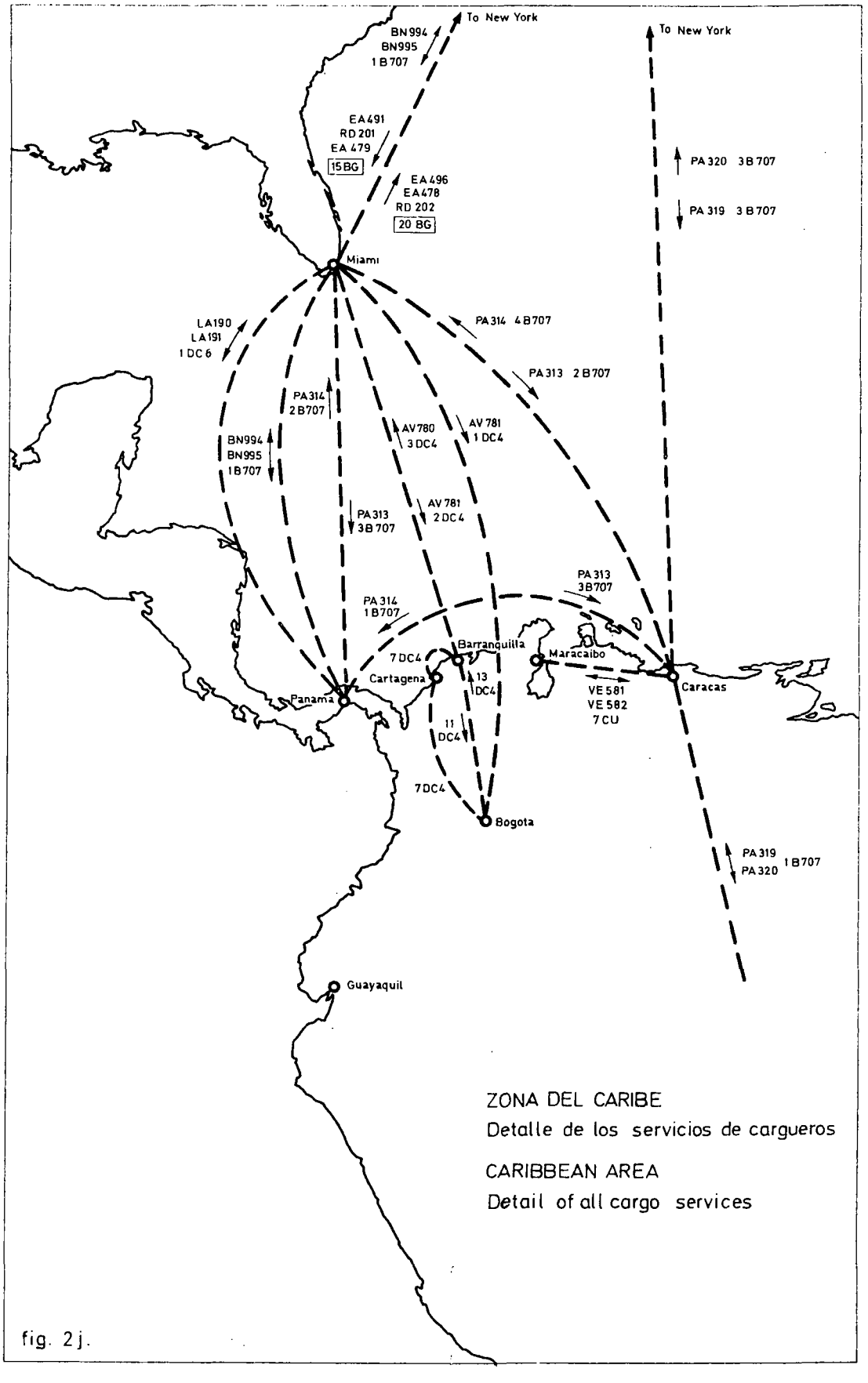

To New York
BN994
BN995
1 B707
To New York
EA491
RD 201
EA 479
15 BG
EA 496
EA478
RD 202
20 BG
PA 320 3 B707
PA 319 3 B707
Miami
LA190
LA191
1 DC 6
PA 314 4 B707
PA 313 2 B707
PA 314
2 B707
BN994
BN995
1 B707
AV 780
3 DC4
AV 781
1 DC4
PA 313
3 B707
AV 781
2 DC4
PA 313
3 B707
PA 314
1 B707
Barranquilla
7 DC4
Cartagena
13
DC4
Maracaibo
Caracas
Panama
VE 581
VE 582
7 CU
11
DC4
7 DC4
Bogota
PA 319
PA 320
1 B707
Guayaquil
ZONA DEL CARIBE
Detalle de los servicios de cargueros
CARIBBEAN AREA
Detail of all cargo services

fig. 2j.

SEASONAL VARIATION AND CARGO TONNE-KM CARRIED, AND TOTAL CAPACITY FOR A TYPICAL AIRLINE FOR 1966

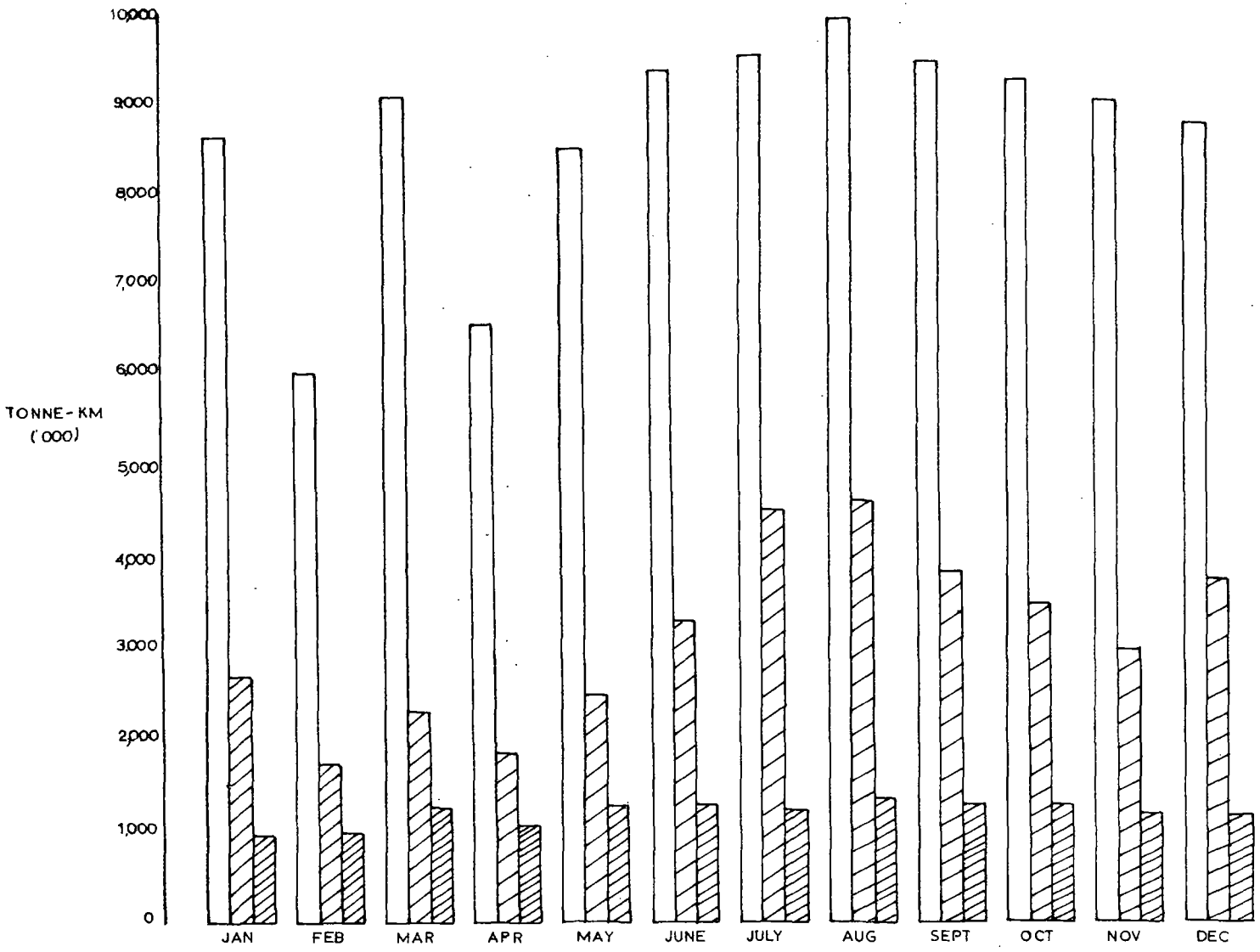


Fig. 2k.

SOURCE: ICAO

SECTION 3

AIR CARGO DEMAND FORECAST TO 1980

THE APPROPRIATE PERIOD, FOR THE PURPOSES OF THIS STUDY, FOR THE ESTIMATION OF DEMAND FOR AIR CARGO IS THE NEXT DECADE. SEPARATE FORECASTS OF TOTAL INDUSTRY TRAFFIC ARE MADE FOR 1975 AND 1980. THE FORECASTS ARE MADE ON AN ORIGIN-DESTINATION BASIS BETWEEN THE SEVEN FALAC COUNTRIES, THE UNITED STATES AND OTHER REGIONAL AND EUROPEAN COUNTRIES.

AIR TRADE BETWEEN PAIRS OF COUNTRIES IN THE REGION HAS BEEN VERY DEPENDENT ON THE TOTAL TRADE BETWEEN THESE PAIRS OF COUNTRIES. LARGE VARIATIONS IN AIR TRADE ON CERTAIN ROUTES ARE THE RESULT OF THE UNSTABLE PATTERNS OF INTERNATIONAL TRADE IN THE REGION. ASSUMPTION OF STEADY AND ACHIEVABLE RATES OF GROWTH OF TOTAL TRADE BETWEEN FALAC COUNTRIES ARE THE BASIS OF THE AIR CARGO FORECASTS. UNPREDICTABLE FLUCTUATIONS IN TOTAL TRADE WILL BE A MAJOR HAZARD IN PLANNING TRAFFIC GROWTH ON INDIVIDUAL ROUTES.

THERE IS ALREADY A GREAT DEAL OF HIGH VALUE TRADE IN THE REGION SUITABLE FOR AIR TRANSPORT BUT PRESENTLY MOVING BY SURFACE. MOST OF THIS POTENTIAL TRADE IS TO AND FROM THE UNITED STATES AND THE MOST IMPORTANT FALAC ORIGIN-DESTINATION COUNTRY IS VENEZUELA.

FURTHER POTENTIAL FOR DEVELOPMENT OF AIR CARGO LIES IN A SMALL NUMBER OF AGRICULTURAL COMMODITIES. HOWEVER CONSTRAINTS ON THE RATE OF GROWTH EXIST IN THE COST-ACCESSIBILITY OF NORTHERN MARKETS, AND IN THE PROBABLE SLOW DEVELOPMENT OF AGRICULTURAL SUPPLY AND A MARKETING INFRASTRUCTURE.

DEVELOPMENTS IN SURFACE TRANSPORT ARE OF SECONDARY IMPORTANCE IN DETERMINING THE RATE OF GROWTH OF AIR TRANSPORT.

IT IS NOT TO BE EXPECTED THAT EXTRA TRAFFIC WILL BE GENERATED BY A CONTINUING LOWERING OF AIR FREIGHT TARIFFS. IT IS PROBABLE THAT THE BASIC TARIFFS FOR AIR FREIGHT WILL NOT CHANGE IN THE FORESEEABLE FUTURE IN THE REGION. CHANGES IN THE MIX OF CARGO, INCLUDING A STRONG MOVEMENT TO CONSOLIDATED LOADS, WILL TAKE PLACE WITHIN THE EXISTING TARIFF STRUCTURE.

ANNUAL GROWTH RATES OF AIR CARGO TRAFFIC WILL VARY, ACCORDING TO THE ROUTES, BETWEEN 14% AND 25% UP TO 1975. RATES OF GROWTH IN THE SAME RANGE WILL ALSO APPLY UP TO 1980.

FOR ALL FALAC COUNTRIES THE DOMINANT ROUTE WILL CONTINUE TO BE TO AND FROM THE UNITED STATES.

TOTAL INTERNATIONAL SCHEDULED AIR CARGO TRAFFIC OF THE SEVEN COUNTRIES WILL EXCEED 210,000 TONNES IN 1975.

THE NORTH-SOUTH IMBALANCE OF AIR CARGO TRAFFIC WILL CONTINUE AT LEAST TO 1980.

SECTION 3

AIR CARGO DEMAND FORECAST TO 1980

Index

3.1 Air Cargo Growth Forecasting by Route : Factors in Cargo Demand

3.1.1 Central to this study is the forecast of future air cargo demand available to the FALAC carriers. It has been decided that the appropriate period of forecast both from the point of view of studying the economic feasibility of FALAC and also keeping within the bounds of reasonably accurate estimation, is 10 years.

3.1.2 Air cargo traffic forecasts are made on all the major routes, and on an origin/destination basis, for the years 1975 and 1980.

3.1.3 The forecasts are made for the entire industry trade on each route, not just that of the FALAC carriers.

3.1.4 The forecast of demand, will depend on several factors (Figure 3.1a). For the general class of air cargo trade we include:-

1. Total Trade

   The pattern of trade both between the FALAC countries, and to and from the non-regional destinations, will vary between now and 1980, and forecasts of the likely pattern of trade in the next decade are made.

2. Commodity 'Mix of Trade'

   Not only the trade but the trade in certain commodities, especially high value manufactured goods, will also be a major determinant of air cargo in 1975 and 1980. Changing developments in the composition of 'mix' of trade on each route must be made.

These two factors are combined in a TRADE MODEL (Figure 3.1a) to produce a forecast of high value trade on each route, the basic potential trade available for air transport.

3.1.5 3. Probable Limits of Air Penetration

This can be described as the air share potential. Two distinct models are used to describe air penetration potential on each route.

a) The ratio of average total distribution cost, by air and surface transport for typical trade items, describes the relative advantage of air to surface for each route. This presumes that the air transport decision will depend on relative advantage. Probable developments in surface transport will affect this ratio and hence the relative advantage of the modes for certain routes.

b) Alternatively, and rather more simply, we assume that there is a "threshold" value of commodities which can bear air transport.

3.1.5 The actual growth in demand - the realisation of this potential - will depend on two mechanisms:-

a) Learning; the increase in sophistication in shippers transport decisions, the growth in the consolidating industry etc. This rate of learning will clearly be different in each country but is a long run factor. The importance of this mechanism in Latin America is underlined by the extreme concentration of present users of air freight and the large marketing efforts which will be required by the operators to increase awareness of air transport.

b) In addition there will be a short run response of present air cargo users to tariff changes, whereby other products will be transferred to the air mode. For Latin American air cargo traffic, short-term movements also depend greatly on short-term trade fluctuations through import licencing policies.

3.1.6 Perishables - New Commodities

For perishables, fresh agricultural produce, fresh soft fruits, fresh shellfish, newspapers, where trade could not exist without air transport, a distinct growth mechanism exists. These items, and in addition, the major potentials for new commodities in the perishable area, are forecast separately.

"LONG RUN" MODEL FOR AIR CARGO FORECASTING FOR SINGLE INTERNATIONAL ROUTE

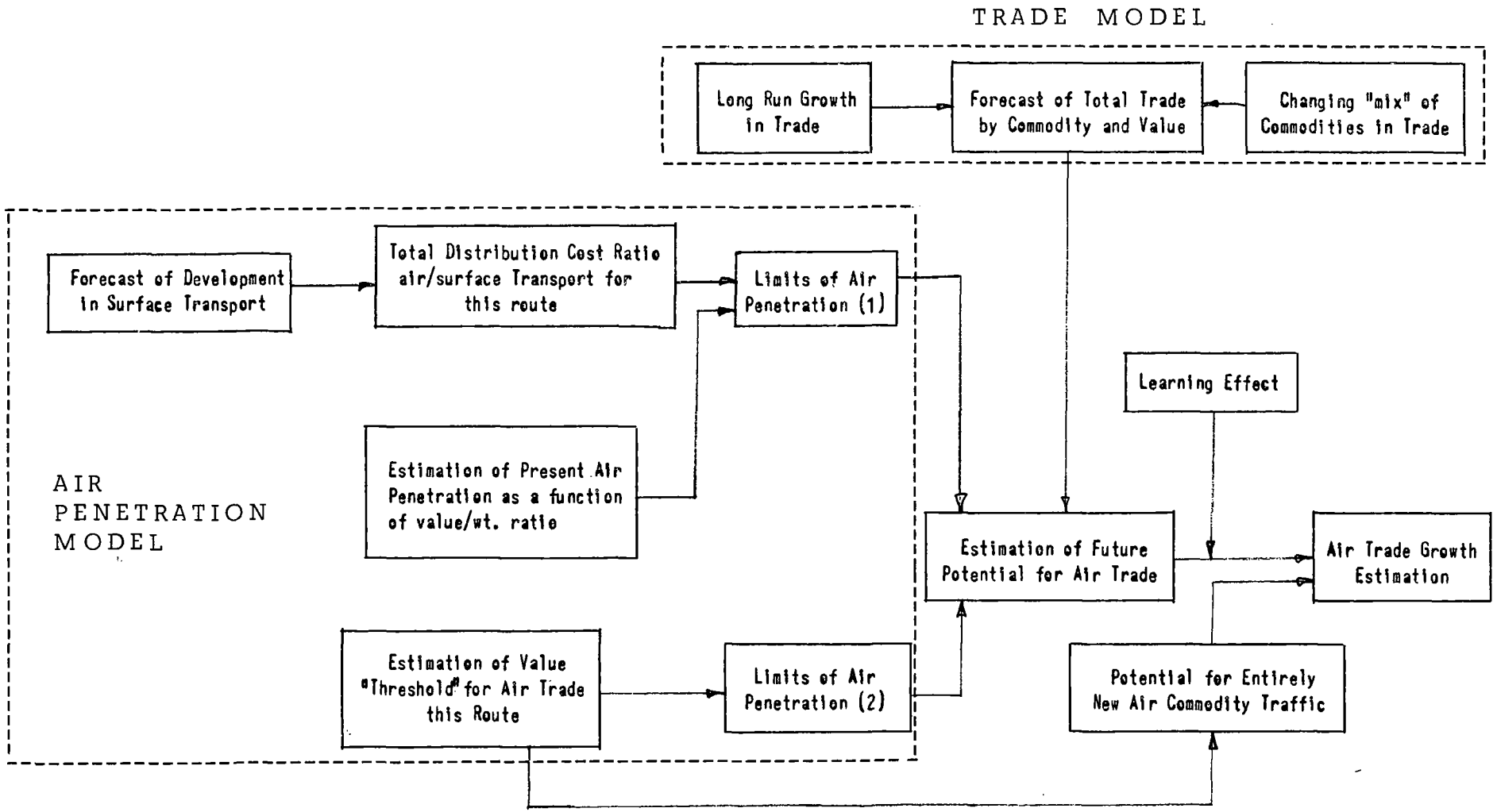


Figure 3.1.a

3.2 Total International Trade

3.2.1 International Trade

The general trends in Latin American trade patterns are well known and need only be referred to insofar as they effect the possible future development of air cargo demand. An influence of first importance is the movement towards increased economic integration. This is still at an early stage, but is increasingly regarded as an essential means of avoiding the very serious circumstances which have been otherwise predicted for some Latin American countries. Consequently, real progress in this direction must be expected over the next decade.

3.2.2 Trends in Latin American Trade

Over the period 1962-1966, the average annual growth rate in Latin American exports was 6.4%, as compared with only 3.3% over the longer period 1954-1966. This very largely derived from a recovery in the export prices for commodities making up a large part of this trade, which had been declining up to 1962. However, this relatively rapid and continuous growth in exports halted in 1967, partly due to a decline in export prices of about 2%, in which improvements in the export prices of cotton, sugar, wheat and cocoa were more than counterbalanced by falls in those of meat, copper and coffee.

Percentage of the Annual Changes in Value of FOB Exports, FALAC Countries

	1965	1966	1967
Argentina	5.9	6.7	- 8.1
Bolivia	18.3	14.5	15.9
Chile	9.8	28.0	1.1
Colombia	- 1.6	- 5.0	-
Ecuador	9.9	3.9	8.1
Peru	6.7	- 2.6	- 14-5
Venezuela	1.5	- 1.1	(6.2)

Source IMF

3.2.3 In general, Latin American trade tended to follow traditional geographic patterns during 1967, though trade with North America declined slightly and that with the E.E.C. and Japan increased, representing 20% and 5% respectively of total Latin American exports in that year.

3.2.4 Intra-Latin American trade remained small, amounting to only 10% of the total trade of these countries in 1966.

3.2.5 Imports for Latin America as a whole increased during 1967, but some FALAC countries, notably Colombia, showed a marked fall in the value of imports, due largely to the re-imposition of import restrictions in November, 1966.

Percentage Change in Value of CIF imports, FALAC countries

	1965	1966	1967
Argentina	11.3	- 6.3	- 2.5
Bolivia	29.9	9.5	(8.7)
Chile	- 0.5	25.0	(6.0)
Colombia	22.5	48.5	-26.3
Ecuador	4.5	2.9	8.9
Peru	-24.2	9.3	3.0
Venezuela	14.5	8.4	9.7

Source IMF

3.2.6 Trade of Individual Countries

The decline in Argentina's imports is largely to be explained by the devaluation of March 1967, and prior to that, to the falling of domestic demand due to the decline in industrial and agricultural production. As would be expected, the decline was most marked in the imports of consumer goods. The decline in Argentina's exports (-8.1% in 1967), was largely due to a contraction in demand for grains, though a 20% fall in wool exports, also largely caused by slackening demand, contributed. The decline in unit values of meat exports was to some extent offset by a small rise in volumes, though for this commodity, exports were 4% down in 1967.

3.2.7 The effect on Colombia's imports of the re-imposition of import restrictions has already been mentioned. In general, exports have been stagnant, due to the heavy reliance on coffee, accounting for 63% of total export earnings. Unit prices of coffee dropped in 1967 by 11%. However, increases were noted in exports of manufactures, which rose from $ 35m in 1965 to $ 43m in 1966. Colombia's exports to other LAFTA countries declined in 1967.

3.2.8 Chile's exports remain heavily dependent on copper, which accounted for 70% of total exports in 1967. This industry has been subject to labour troubles, and production increased by only 3% in 1967. Prices for copper declined, after a recovery for crude copper in 1966.

3.2.9 Peru's imports were affected by the devaluation of 1967, but as this was not until September of that year, the full effect does not show in the 1967 figures. Prices for fish meal exports declined in 1967, after a rise in 1966, so an increase in volume of 14% was accompanied by a drop in value of 1%. An increase in the U.S. sugar quota for Peru enabled sugar earnings to increase during 1967.

3.2.10 Ecuador's exports face the difficulties of all banana producers - an average rate of increase in world production of 5.6% per annum, against an increase in world consumption of only 4%, and a decline in export prices of around 3.8%. The losses in the U.S. market have been to some extent countered by gains in Europe, but these remain very vulnerable to Common Market policies. Cocoa and coffee follow bananas in importance, the latter doing well against a generally discouraging world market background. Pyrethrum has grown to be an export of considerable value (US $1.6m in 1966), and

the shift towards exporting the extract rather than the flowers is clearly of interest to air freight. Fish exports also offer good potential and had realised $6.3m in 1966. Imports rose by 18% in 1967, though the rapid rise of 1963 - 1965 had slowed down in 1966 due to the introduction of import surcharges. Local industries have been growing rapidly behind the protection of tariff barriers.

3.2.11 Background to the Forecasting of Trade

Future trade prospects for the FALAC countries will depend on the development of their internal economies.

3.2.12 The Latin American continent as a whole is characterised by high rates of population growth. There are numerous estimates of rate of population growth, which vary slightly. Within the FALAC countries, there are quite widely differing growth rates:-

Country	Annual Rate of Population Increase 1963-1966 Source (1) %	Annual Rate of Population Increase 1963-1966 Source (2) %
World	1.9	-
Argentina	1.5	1.5
Bolivia	1.4	1.4
Chile	2.1	2.2
Colombia	3.2	3.3
Ecuador	3.4	3.4
Peru	3.1	3.1
Venezuela	3.1	3.5
	(Source: United Nations Statistical Yearbook)	(Source: Statistical Bulletin of Latin America)

3.2.13 Based on these growth rates, the 1966 mid-year population of each FALAC country can be projected forward to give estimates of the populations in 1975 and 1980. The average rate of growth of the populations of FALAC countries as a whole would be of the order of 2.6% per annum between 1975 and 1980.

Country	Projected Populations (in millions)			
	1975 (1)	1980 (1)	1975 (2)	1980 (2)
Argentina	25.9	27.95	25.8	27.6
Bolivia	4.2	4.55	5.3	6.0
Chile	10.55	11.7	11.3	12.9
Colombia	24.7	28.9	23.8	27.7
Ecuador	7.0	8.5	7.2	8.5

3.2.14 If the 1963-1966 growth rates are maintained, the population of the FALAC countries will amount to about 48% of the population of the United States, projected to 1980 by the same method. By virtue of population, therefore, the FALAC countries will constitute a major block within the Western Hemisphere.

3.2.15 The main problem facing FALAC country governments is to maintain a growth rate in National Product which exceeds the population growth.

3.2.16 Against this background, an analysis was made of all available national plans of the FALAC countries. With some exceptions, these plans were under review, and many targets were being revised. Some had been based on estimates which have turned out to be too optimistic, and in other cases, unforeseen circumstances had intervened to change radically the assumptions on which the plans had been based. Therefore, although careful note was taken of the provisions of each available plan, they were evaluated against an analysis of observed trends during the past and any plans which provided for a very marked change in these patterns were treated with some reserve.

Account was taken of known structural changes in each FALAC country, in terms of population distribution, industrialisation, etc., and it was considered that these would be most unlikely to make a dramatic change in any of the determinants of air freight demand up to 1975 or even 1980.

3.2.17 A comparative study was made of available forecasts of gross national and domestic products. After due allowance for the different methodology used in these forecasts, where there appeared to be a conflict between two forecasts, more weight was given to the one which tended to reflect past performance more accurately. The projections derived in this way therefore tend to be rather conservative.

3.2.18 However, they indicate that per capita, gross national products could average $827 in 1975 and $1,069 in 1980, for FALAC countries as a whole, including Venezuela. If Venezuela is excluded, the other FALAC countries should achieve per capita gross national products of $747 and $827 in 1975 and 1980 respectively.

3.2.19 Although per capita and total gross national products provide a useful comparison between the general economic level of two or more countries, neither has been found particularly useful in the estimation of trade levels as a whole, or air trade levels in particular.

3.2.20 Demand for air freight is closely associated with demand for consumer and capital goods. Under the conditions prevailing in Latin America, both total and per capita gross national products give no indication of the distribution of national income within the population of the country. The urgent need for a broader distribution of income is clearly recognised in the plans of most of the FALAC countries. But, unfortunately, reliable data on the present distribution proved very hard to obtain, and therefore only broad assumptions could be made about future patterns. It has however been estimated (ECLA 1966) that nearly two thirds of Latin America's rural population has an income so low that only the smallest margin is available for the purchase of non-food manufactures.

3.2.21 Assuming however that the income redistribution policies of the FALAC Governments will be largely successful, it follows that the demand for consumer goods, hence capital goods and manufactures, will expand at a faster rate than per capita or total gross national products, after allowing for price adjustments. This hypothesis was tested against historical data, and was found to be valid where the pattern had not been disturbed by imposed factors.

3.2.22 For all FALAC countries expenditure on private consumption has remained a more or less constant proportion of gross national products over the period 1960-1965, being at its highest (82.5% in 1965) for Bolivia, and at its lowest (62.1% in 1965) for Venezuela. In other words, a relatively small proportion of gross national products has been available for Government expenditures, stocks or capital formation. Again, authoritative forecasts of likely future levels of personal consumption were not available. It could however be expected that past trends might continue at least up to 1980, with the exception of Peru, where the personal consumption component has been rising rather sharply. Adjusted estimates for FALAC countries show some differences from country to country with Venezuela having the smallest relative private consumption component.

	Estimated Personal Consumption Component as Percentage of Expenditure for 1975 (Constant Market Prices)
Argentina	75%
Bolivia	73%
Chile	72%
Colombia	79%
Ecuador	77%
Peru	80%
Venezuela	63%

3.2.23 Forecasting of Trade

It was impossible to obtain systematic forecasts of trade flows among FALAC countries, or between them and the rest of the world. Official or semi-official estimates were available for two countries only, and in the absence of a detailed account of the methodology behind them, their usefulness to the study as a whole could not be assessed. Not only were forecasts not in general available, but some basic data on trade flows presented many analytical difficulties, omissions, and possible inaccuracies.

3.2.24 Of special importance to air freight is the volume of commerce between any two countries which does not show up in the trade figures because it does not come within the surveillence of the Customs and Excise.

3.2.25 The kind of commodities which are most liable to be smuggled are the high value goods which would be obvious candidates for air-freighting, with the exception of cattle on the hoof. From various informal estimates it would appear that the value and volume of contraband commerce is quite large for some FALAC countries. This creates another problem - the apparent growth in legitimate trade in high value items to some extent reflect more the increasing success of the Customs authorities in controlling trade, than

3.2.26 It was therefore necessary to produce projections of foreign trade, and the rationale behind the method adopted was as follows:-

1. That an econometric trade model approach posed considerable problems, and was very unlikely to give results any more useful than a time series projection, for the particular countries under review.

2. That the period 1963-1966 (in some cases 1961-1966) was the most appropriate base period, despite the statistical limitations of such a very short series. Results for 1967 were included where possible.

3. That certain structural changes in trade patterns would require modifications to be made for the projections, although up to 1975 these would be relatively minor.

4. That the projected levels of imports and exports would necessarily be such as to provide for balance of payments equilibrium, or likely levels of capital import for certain countries.

5. That an approach yielding conservative estimates would be more appropriate than one that postulated very high rates of growth.

3.2.27 The total value of a country's foreign trade tends to be a self-generating function. This is to say, the rate of growth tends to remain constant over the short-run. The IMF figures for values at current prices of total trade of FALAC countries were therefore tested against the hypothesis that they followed a geometric growth pattern.

3.2.28 Over the period 1963-1966, this hypothesis was closely in line with the data for 24 out of the 36 intra-FALAC country-pairs for which data were available. In mathematical terms, the co-efficients of correlation approached 1. However, such a small number of observations cannot be used for detailed statistical analysis. In another 4 cases, the values of trade in those particular directions were declining. However, the period tested coincided in some cases with a very exaggerated period of growth, and the extrapolation of such growth rates into the future gave results which were clearly impracticable. The hypothesis of a continuously decreasing growth rate was accordingly tested. Once again, 24 country-pairs had foreign trade patterns which fitted this hypothesis closely.

3.2.29 Projections of value of foreign trade at current prices, though admittedly based on a small number of observations between FALAC countries, were therefore prepared on the assumptions that:-

1. Trends shown between 1963 and 1966 are broadly likely to continue (with the exception of the modifications discussed below)

2. The rapid growth rates in foreign trade between certain country-pairs within FALAC cannot be maintained.

3.2.30 Total Trade Projections

These projections, which must be seen as the continuation into the future of past trends rather than as prophecies, indicate very clearly the great difference in scale between the foreign trade of different FALAC countries.

Country	Total Value of Foreign Trade US $m		Average Annual Rate Of Growth
	1975	1980	
Argentina	3,795	4,282	2.44%
Bolivia	682	893	5.53%
Chile	3,618	4,692	5.33%
Colombia	1,334	1,488	2.20%
Ecuador	734	886	3.83%
Peru	2,987	3,795	4.90%
Venezuela	4,962	5,502	2.08%

3.2.31 The average annual rate of growth represented by the projections for 1975 and 1980 reflects the relative growth rates in foreign trade as reported in 1963-1966, assuming that such growth rates will decline systematically.

3.2.32 This analysis indicates that intra-FALAC trade could be expected to grow rather faster than total trade, or than individual FALAC countries' exports to the United States.

Imputed Average Annual Rates of Growth (Based on Projection of FOB Value of Exports, 1963-1966 and 1975-1980

	Derived Average Annual Rate of Growth, Percentage 1975-1980		
	Exports to World	Exports to US	Exports to other FALAC countries
Argentina	3.2%	5.5%	4.5%
Bolivia	5.5%	6.0%	6.0%
Chile	5.3%	3.1%	5.9%
Colombia	2.4%	2.4%	6.8%
Ecuador	3.8%	3.9%	4.5%
Peru	4.5%	5.5%	9.2%
Venezuela	1.0%	2.7%	(-7.0%)

3.2.33 Projections of imports follow the same pattern, except that Argentina would appear to be developing exports more rapidly than imports, whilst the converse is true for Venezuela.

3.2.34 The growth rates given above indicate that by 1975 and 1980, substantial trade flows could be expected between FALAC countries, on the assumptions outlined above.

Projected Total Current Value of Exports to Other FALAC Countries

US $m

Exports From	1975	1980
Argentina	227	283
Bolivia	22	29
Chile	109	146
Colombia	100	139
Ecuador	33	42
Peru	93	144
Venezuela	177	123

3.2.35 On the assumptions outlined above, past performance suggests that trade between FALAC countries could develop by 1975 to a total value of US $698.5 million, distributed by country pairs as shown below. For the reasons given such estimates must be treated with caution, as indications of orders of magnitude.

Projection of International Trade, 1975

US $m

TO / FROM	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela	United States	EEC
Argentina	-	22	114	14	1	69	8	269	-
Bolivia	5.5	-	6	1	1	7.5	1	160	50
Chile	70	2.5	-	10	3	7	16	318	127
Colombia	42	1	4	-	12	32	9	356	175
Ecuador	7	1	4	7	-	13	1	163	68
Peru	43	2	20	26	1	-	19	680	340
Venezuela	29	1	90	2	28	27	-	1,355	590
United States	397	61	525	299	146	639	838	-	-
EEC	159	50	127	175	68	340	590	-	-

3.2.26 Trade in Manufactured Goods

For the foreseeable future, the bulk of the exports of FALAC countries will be made up of primary products of too low a value in relation to their weight to ever be considered as possible candidates for carriage by any type of air vehicle now or in the future.

3.2.37 A special study was therefore made of trade in high value goods, and in particular of manufactures. The difficulties encountered in projections of total trade were even more marked for trade in manufactures, since it is highly vulnerable to imposition of import restrictions and other largely unpredictable factors. Projections from time series were checked against overall projections for foreign trade, with projections of GDP total and per capita, and examined further in the light of known indistrialisation plans and trade policies. Strict comparability between different pairs of countries was obtained as far as possible, although obviously the description "manufactures" lends itself to different interpretations.

3.2.38 In general two definitions were used; where possible, the SITC grouping codes 6, 7, 8 and 9 were isolated as "manufactures"; in other cases, trade in vehicles, machines and miscellaneous manufacturers were summed. Patterns which were very erratic, due to the factors mentioned above, were excluded as being impossible to use as the basis of a forecast. 17 intra-FALAC country-pairs were selected on this basis, and were found to give close agreement in projected growth rates in manufactures for the period 1975-1980.

3.2.39 13 of the 17 country-pairs showed average annual rates of growth of between 5% and 6%.

3.2.40 It is likely that some countries may well exceed 6% per annum in growth of exports of manufactures over short periods, but as stressed above, much will depend on the import substitution policies of Governments, and the impetus towards further economic integration.

3.2.41 Even by 1980, exports of manufactures, however defined, are likely to be a small part of total exports for the FALAC countries, although both Chile and Columbia have had a relatively high proportion of manufacturers in their export trade.

3.4.42 The existing very minor role of manufactures (defined as groups 6, 7, 8 and 9 in the SITC) in <u>total</u> exports of the FALAC countries is clearly indicated in the table below.

<u>Percentage by Value in SITC Groups 6, 7, 8 and 9</u>

	<u>Exports</u>	<u>Imports</u>
Argentina 1966	2	78
Bolivia	3	75
Chile	64	70
Colombia	5	69
Ecuador	1	73
Peru	29	77
Venezuela	1	76

Source: United Nations Handbook

Percentage by Value at 1955 prices of Total Exports Accounted for by Vehicles, Machines and Miscellaneous Manufactures, by Inter-FALAC Country-Pairs, 1963

FROM \ TO	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Argentina	-	11%	9%	8%	23%	3%	9%
Bolivia	-	-	1%	100%	-	2	100%
Chile	15%	51%	-	41%	62%	27%	3%
Colombia	6%	88%	7%	-	13%	11%	24%
Ecuador	26%	53%	25%	40%	-	-	77%
Peru	-	43%	4%	1%	38%	-	2%
Venezuela	1%	98%	1%	23%	-	1%	-

Source: "Latin American Trade Patterns" Baerrenson et al

Percentage by Value of Total Trade From FALAC Countries to the United States, Accounted for by SITC Groups 6, 7, 8 and 9, 1967

	U.S. Imports from	U.S. Exports to
Argentina	13%	71%
Bolivia	9%	68%
Chile	79%	75%
Colombia	7%	66%
Ecuador	2%	72%
Peru	45%	66%
Venezuela	1%	70%

Source: Department of Commerce

3.2.43 For inter-FALAC trade there has been a wide variation in the share of manufactures in total exports.

Total Value of Exports

Manufactured Goods as Percentage of Total Exports

TO / FROM	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Argentina 1963	-	4,505 11%	41,476 9%	8,194 8%	319 23%	35,534 3%	8,191 9%
Bolivia 1962	1,880 -	-	263 1%	0.2 100%	- -	173 2%	0.2 100%
Chile 1963	14,467 15%	486 51%	-	871 41%	740 62%	3,704 26%	1,364 3%
Colombia 1963	542 6%	14 88%	268 7%	-	2,680 13%	1,822 11%	917 24%
Ecuador 1963	3.8 26%	8.1 53%	9.3 25%	0.5 40%	-	1.5 -	16.8 77%
Peru 1963	6,363 -	1,508 43%	24,665 4%	1,751 1%	1,443 38%	-	3,069 2%
Venezuela 1963	15,471 1%	5 98%	6,290 1%	1,161 23%	2,749 -	4,206 1%	-

Total Value of FOB exports (thousands of US $)

Percentage by Value of Export Accounted for by Machines, Vehicles and Miscellaneous Manufactures.

Source: "Latin American Trade Patterns
Baerensan et al"

3.2.44 Progress towards industrialisation

Each FALAC country has plans for stepping up the pace of industrialisation, and for the substitution of imports of manufactured goods. However, it seems that the basic problem of high production costs for manufactures will remain a serious brake on the development for the foreseeable future.

3.2.45 Comparisons of consumer prices of consumer durables can be misleading, but almost without exception Latin American market prices are higher than those in the United States, whether official or free market rates of exchange are used.

Estimated Unit Price Comparisons for Selected Goods, between FALAC Countries and the United States, US = 100 at Estimated Parity Rate of Exchange

	Bicycles	Refrigerators	Television	Calculating Machines
Argentina	200	361	300	244
Colombia	230	444	420	206
Chile	520	111	775	312
Peru	410	555	240	238
Venezuela	125	167	180	94
United States	100	100	100	100

Source: "The Process of Industrial Development in Latin America" ECLA 1966

3.2.46 The differences would have been considerably greater if the comparison had been made with Japan, West Germany, or Italy although such comparisons, being based on consumer prices, are affected by the value of import dues and many other factors.

3.2.47 Whatever data becomes available in the future, it is clear that production costs of manufactured consumer durables will remain high relative to the industrial countries. The reasons for this are well known, and include the high cost of capital, low productivity of labour, restricted home markets, high prices of materials, and inability to take advantage of economies of scale in manufacture.

3.2.48 The implications for air freight of this situation are of great importance. Although most FALAC country governments have plans for import substitution linked to overall industrialisation projects, the trend towards further integration of the continent necessarily requires a greatly facilitated movement of goods between the countries, and the import of manufactures from these sources which permit the lowest final price to the consumer.

3.2.49 It is therefore an essential task of any co-ordinated research unit FALAC may set up, to maintain close liaison with government planners in the industrial sector, and to ensure that the potential input represented by air freight is fully considered in the formulation of plans.

3.2.50 Taking into account the probable pace of industrialisation in each country, movements towards integration, rising living standards and efforts towards income redistribution and increasing capacities to import, the share of manufacturing in each trade flow could be of the orders shown below, giving rise to a substantial increase in inter-FALAC trade in manufactures. (It must be stressed again that many largely unpredictable factors, such as sweeping changes in government trade policies, introduce a high degree of uncertainty into any forecasts).

Manufactures as Percentage by Value of Total Exports

TO / FROM	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Argentina	-	4	15	3	0.3	5	1
Bolivia	2	-	1	0.3	0.3	1	0.2
Chile	15	1	-	4	2	2	1
Colombia	3	0.7	1	-	2	5	3
Ecuador	2	0.5	1	3	-	4	0.7
Peru	4	1	2	1	0.4	-	1
Venezuela	2	1	3	1	2	2	-

Gross National Product at Market Prices
(Millions of U.S. dollars.)

Country	Estimated Actuals				Projection based on geometric trend		
Year	1968	1963	1965	1966	1970	1975	1980
Argentina	11,082	12,282	18,764	18,734	23,960	33,860	47,840
Bolivia	347	482	605	682	913	1,380	2,081
Chile	2,859	2,685	4,534	5,143	6,050	9,844	15,990
Colombia	3,365	5,230	5,992	6,256	8,832	13,110	19,490
Ecuador	788	893	1,103	1,175	1,379	1,760	2,250
Peru	1,848	2,582	3,016	-	4,235	5,990	8,480
Venezuela	5,291	6,256	7,605	7,940	11,190	16,860	25,400

Source: United Nations.

Table 3.2.a

Trade of FALAC countries with LAFTA
Millions of U.S. dollars

Country	Exports from country to group (f.o.b.)			Imports to country from group (c.i.f.)		
	1964	1965	1966	1964	1965	1966
Argentina						
Total (DOT)	1410.3	1492.5	1593.3	1077.4	1198.6	1124.6
Lafta	235.2	246.6	254.6	201.2	289.3	252.3
Lafta %	16.7	16.5	16.0	18.7	24.1	22.4
Bolivia						
Total (DOT)	113.9	131.9	150.4	102.9	134.1	138.4
Lafta	2.2	3.5	7.7	8.2	13.3	14.0
Lafta %	1.9	2.7	51.	8.0	9.9	10.1
Chile						
Total (DOT)	625.8	687.8	880.5	608.5	603.6	682.8
Lafta	56.4	56.4	60.0	135.3	137.0	150.9
Lafta %	9.0	8.2	6.8	22.2	22.7	22.1
Colombia						
Total (DOT)	548.1	538.9	507.4	586.5	453.4	674.3
Lafta	12.6	15.5	31.7	34.9	39.3	57.9
Lafta %	2.3	2.9	6.2	6.0	8.7	8.6
Ecuador						
Total (DOT)	204.8	223.4	223.6	147.6	166.9	176.3
Lafta	14.6	15.7	16.4	9.6	16.4	18.2
Lafta %	7.1	7.0	7.3	6.5	9.8	10.3
Peru						
Total (DOT)	667.2	667.6	764.6	579.1	729.8	817.2
Lafta	71.5	62.3	60.6	64.1	88.6	100.4
Lafta %	10.7	9.3	7.9	11.1	12.1	12.3
Venezuela						
Total (DOT)	2742.4	2784.2	2712.7	1149.0	1322.3	1216.3
Lafta	151.1	154.6	141.3	34.5	32.8	32.0
Lafta %	5.5	5.6	5.2	3.0	2.5	2.6

Source: IMF

Export of Commodities 6, 7, 8 and 9 as a Percentage of Total Exports (By Value)

TO / FROM	Argentina	Bolivia	Chile	Columbia	Ecuador	Peru	Venezuela
Argentina (1966) (1)	-	21.6%	34.3%	36.2%	79.1%	8.5%	42.0%
Bolivia (1967) (2)	0.2%	-	92.0%	100%	100%	99.8%	100%
Chile (1965) (3)	75.4%	-	-	-	81.3%	-	-
Colombia (1966) (4)	6.8%	-	68.5%	-	65.2%	10.8%	82.1%
Ecuador (1967) (5)	0.2%	64.8%	0.6%	0.6%	-	58.3%	65.3%
Peru (1966) (6)	85.2%	-	-	-	98.1%	-	-
Venezuela (1967) (7)	2.1%	-	-	-	0.9%	-	-

Sources:

(1) Comercio Exterior (1966) - Argentina

(2) Boletin Estadistica No. 93 (1967)

(3) Comercio Exterior (1965) - Chile

(4) Boletin Mensual Estadistica No. 192 (1966)

(5) Boletin No. 65 Intercambio Comercial Del Ecuador (Integracion)

(6) Estadistica Del Comercio Exterior (1967) - Venezeula

Table 3.2.c

Value of Inter-FALAC trade in machinery, vehicles and miscellaneous manufactures (thousands of U.S. dollars).

TRADE FROM	for years	TO Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
Argentina	1959		443.2	1310.0	32.3	7.1	72.8	311.6
	1960		267.0	1089.1	53.1	7.8	256.3	184.1
	1961	-	220.5	2099.1	86.9	27.1	469.8	202.7
	1962		324.9	767.2	71.6	6.4	300.3	324.9
	1963		495.2	3660.8	662.9	72.3	1076.8	729.6
Bolivia	1959	0.1		15.5	-	-	17.7	-
	1960	0.1		7.7	-	-	0.3	-
	1961	6.7	-	20.5	0.2	-	1.6	-
	1962	0.9		3.3	0.2	-	2.2	0.2
	1963	N.A.						
Chile	1959	222.7	17.7		396.5	20.0	103.1	7.9
	1960	1144.9	27.0		112.4	48.9	104.5	33.8
	1961	1997.1	192.5	-	24.9	61.3	264.2	235.1
	1962	1056.3	38.4		437.2	17.9	169.5	218.9
	1963	2113.1	247.4		354.0	460.4	980.7	45.6
Colombia	1959	-	2.4	15.9		182.1	102.5	994.0
	1960	17.4	2.2	220.2		127.9	61.9	1091.8
	1961	15.9	7.7	12.2	-	94.9	576.0	819.3
	1962	11.1	16.3	36.8		197.9	194.4	739.2
	1963	34.3	11.8	17.6		361.1	201.7	216.4
Ecuador	1959	0.2	4.0	4.5	0.6		6.0	45.5
	1960	7.6	7.0	6.1	213.9		20.7	40.0
	1961	21.2	14.6	8.9	23.0	-	17.7	29.8
	1962	1.0	4.3	2.3	0.2		-	13.0
	1963	3.8	8.1	9.3	0.5		1.5	16.8
Peru	1959	35.6	77.7	69.5	85.4	1467.5		209.8
	1960	1900.0	206.2	137.5	32.5	1558.3		81.7
	1961	1116.4	387.3	134.8	24.1	1030.4	-	45.1
	1962	360.4	381.1	522.1	9.9	737.8		39.5
	1963	19.4	643.2	1042.0	22.9	543.9		53.6
Venezuela	1959	789.8	3.5	57.0	2040.8	1216.1	76.1	
	1960	882.8	4.6	457.7	841.6	54.4	240.7	
	1961	1315.8	0.9	48.9	970.7	275.8	87.6	-
	1962	107.6	6.4	19.1	757.7	55.4	553.1	
	1963	95.7	4.4	44.9	266.2	10.9	61.6	

Source: Latin American Trade Patterns - Baereusan et al

Percentage Value of Total Trade at Current Prices
Between 'FALAC' Countries and Each Other, the U.S.
and Europe

Country		Other 'FALAC' 1965	Other 'FALAC' 1966	U.S. 1965	U.S. 1966	Europe 1965	Europe 1966	All other Latin American 1965	All other Latin American 1966
Argentina	Exports	7.7	7.8	6.4	7.9	59.0	57.3	16.8	16.1
	Imports	7.9	7.6	22.8	22.8	36.7	38.5	24.2	22.6
Bolivia	Exports	1.7	4.3	42.6	39.2	8.1	8.4	2.7	5.1
	Imports	8.4	8.9	43.7	41.2	22.6	25.9	11.9	12.4
Chile	Exports	5.5	4.9	31.0	25.0	37.1	41.6	8.3	6.9
	Imports	15.7	15.5	39.3	34.4	24.1	26.7	23.3	22.6
Columbia	Exports	3.4	6.0	46.7	43.3	36.8	37.7	5.7	7.6
	Imports	5.4	5.0	47.9	48.0	32.0	32.4	10.7	10.5
Ecuador	Exports	6.9	7.1	47.4	42.2	38.9	42.4	7.5	7.6
	Imports	9.0	9.7	48.1	46.9	33.4	34.2	9.9	10.6
Peru	Exports	7.6	6.0	33.8	42.5	42.6	35.7	9.4	8.0
	Imports	9.9	10.8	39.8	39.2	31.9	33.4	12.3	12.7
Venezuela	Exports	2.1	2.4	34.7	36.9	18.8	17.8	7.8	8.1
	Imports	1.6	1.5	50.6	50.4	32.3	32.9	2.7	2.9

Source: IMF

Table 3.2e

3.3 Present Air Freight Commodities and Trends

3.3.1 Prior to analysing the future penetration potential of air trade and possible development of new air freight candidates, the present air component of international trade was examined to identify present trends.

3.3.2 Most FALAC countries do not present their trade figures broken down by mode of transport, except sometimes for totals. However the statistics listing trade between some FALAC countries with some other major trading partners, notably the United States, provided detailed breakdowns by commodity and mode of transport. It was possible in some other countries to have special tabulations prepared to describe air trade separated from total trade.

3.3.3 For U.S. - FALAC air trade, most of the shipments were in the U.S. Department of Commerce Schedule A groupings 6, 7, 8 and 9; that is to say - manufactured goods, machinery and transport equipment, and other shipments not classified by kind.

Percentage by Weight of Total Air Shipments in Schedule A Groupings 6, 7, 8 and 9

	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela
US. imports from:	66	73	48	63	22	38	25
US. exports to:	75	77	75	82	73	87	84

3.3.4 The preponderance of manufactured goods in U.S. - FALAC air trade is much more marked in southbound than northbound movements. U.S. exports by air to FALAC countries (with the exception of Argentina and Chile) have moreover been growing more rapidly from 1964 to 1967 in Groups 6, 7, 8 and 9 than in air trade as a whole.

Average annual rate of Growth (percentage by weight) of Exports from United States to FALAC countries by air 1964 - 1967

United States To:	Total Air Trade	Air Trade in Groups 6,7,8 & 9
Argentina	+ 7	+ 1
Bolivia	+ 8	+29
Chile	+41	+35
Colombia	- 6	- 4
Ecuador	+ 7	+13
Peru	+25	+29

Source: U.S. Department of Commerce

3.3.5 The breakdown of existing air trade into commodities was of the greatest importance to the present study. With a few unsystematic exceptions, FALAC airlines did not have any statistical material available which showed composition of their traffic, and it was therefore necessary to draw a sample of Air-Way Bills and prepare tabulations. Every care was taken to ensure that the sample drawn was representative of traffic as a whole, but unfortunately some FALAC airlines filed their Air-Way Bills in such a way as to make strict sampling control impossible. The months chosen were March and September 1968, although in some cases a longer period was used. Seasonal factors, and the impossibility of obtaining a completely representative sample for every FALAC airline meant that the results cannot be used for grossing up to obtain total traffic estimates for each commodity for each route. They do however serve to give a good picture of existing FALAC airlines cargo traffic over the routes shown.

3.3.6 The full results of the Air-Way Bill analysis are shown in Table 3.3a

3.3.7 In general, with a few notable exceptions, shipping weights for outbound air traffic tended to be small - and a large proportion of the total number of shipments consisted of samples and small spare parts. Although such small shipments produce only low tonnages of cargo, and incur very high unit costs for handling and documentation, since they are rated at the minimum tariff, their revenue yield per tonne-kilometre is extremely high. For example, a 1 kilogram parcel of pharmaceutical samples being shipped from Buenos Aires to Geneva (11,089 kms) would be charged the minimum rate of £18, equivalent to a rate of c.162 per tonne-kilometre.

3.3.8 For Aerolineas Argentinas, only Air-Way Bills originating at Buenos Aires could be tabulated. The well-developed trade in grapes to New York accounted for most of the tonnage over that route (54.6% by weight), although this trade is necessarily highly seasonal. Also of importance were shipments of fish to Rome, leather to London, and flowers and newspapers to Asuncion.

3.3.9 For Ecuatoriana, the sample of Air-Way Bills taken represented traffic over a complete year. The predominance of shipments of personal effects is noticeable for the Quito-Mexico, Quito-Miami, and Quito-Santiago routes. Other shipments of importance were newspapers and printed matter.

3.3.10 For Lan-Chile also, most of the present air shipments were of the miscellaneous variety. For Avianca routes out of Bogota, only printed matter made up a significant portion of the traffic.

3.3.11 Air-Way Bills were not available for VIASA, but use was made of the excellent daily returns of the Chamber of Commerce at La Guaria. Personal effects were of importance to VIASA. Of special interest is the large proportion of bananas carried by Pan American to New York and Miami. The period sampled corresponded to the U.S. dock strike, and although many shippers will return to using sea, it could be expected that where use of air freight proved effective, it is likely to be continued to some extent.

3.3.12 The distribution of shipping weights for the Air-Way Bills sampled is shown in Table 3.3b.

3.3.13 A detailed analysis was made of United States imports and exports from and to the FALAC countries for 1967. A large number of commodities are already being carried entirely or almost entirely by air, and these commodities are summarised below. If the list included commodities of which 80% or more by value were carried by air, many more would be included, particularly among those commodity groupings which include a wide range of articles.

United States Trade with FALAC Countries, 1967

Commodities of which 80% or more by Weight of Total Trade were carried by Air. Schedule A Codes

Exports to:

Argentina	001, 011, 013, 022, 025, 071, 074, 111, 211, 267, 515, 831, 842, 941.
Bolivia	001, 941.
Chile	001, 025.
Colombia	031, 212, 267, 291, 651, 696, 831, 851, 892.
Ecuador	001, 011, 025, 031.
Peru	025, 515, 613, 941.
Venezuela	025, 515, 667, 864, 891, 897, 941.

Imports From:

Argentina	001, 613, 724, 841, 842, 851, 863, 891, 941.
Bolivia	212, 291, 611, 632, 656, 657, 698, 831, 841, 842, 894, 941, 990.
Chile	001, 629, 711, 729, 821.
Colombia	001, 044, 212, 285, 512, 541, 551, 553, 612, 657, 667, 681, 695, 698, 723, 729, 812, 821, 831, 841, 842, 893, 941.
Ecuador	099, 655, 656, 666, 724, 812, 821, 831, 841, 863, 891, 892, 896, 899, 941.
Peru	001, 212, 611, 717, 719, 812, 821, 842, 897, 941.
Venezuela	001, 212, 541, 553, 581, 632, 655, 663, 665, 666, 667, 682, 689, 698, 717, 719, 841, 851, 863, 891, 892, 896.

3.3.14 Decoding of Commodities that for one or more FALAC Country are carried predominantly (80% or more by weight) by air to or from the United States, 1967

001 - Animals , live
011 - Meat - fresh, chilled or frozen
013 - Meat - in airtight containers, meat preparations
022 - Milk and cream
025 - Eggs - birds, except separate albumin
031 - Fish and shellfish - fresh or simply prepared
071 - Coffee
074 - Tea and mate - crude or prepared
099 - Food preparations - not elsewhere classified
111 - Beverages, not elsewhere classified, non-alcoholic
211 - Hides, skins excluding furskins - undressed
212 - Furskins - undressed
267 - Textile Fabric Waste, including rags
291 - Animal materials, not elsewhere classified, crude
515 - Radio-active and stable isotapes & cards etc.
541 - Medicinal and pharmaceutical products
553 - Perfumery, cosmetics, dentifrices etc.
581 - Synthetic resins and plastic materials
611 - Leather
613 - Furskins - dressed, including dyed
632 - Wood manufactures
651 - Textile yarn and thread
655 - Special text fabric and products
656 - Made-up text articles and products
657 - Floor coverings, tapestries etc.
663 - Mineral manufactures,
665 - Glassware
666 - Pottery
667 - Pearls and precious and semi-precious stones
682 - Copper and copper alloys - wrought and unwrought
689 - Base metals and alloys
696 - Table flatware and cutlery
698 - Manufactures of base metal
717 - Textile and leather machinery and parts
719 - Machinery and appliances and machinery parts
724 - Telecommunications apparatus and parts

812 - Plumbing

821 - Furniture

831 - Travel goods, handbags etc.

841 - Clothing

842 - Fur clothing and furskin articles etc.

851 - Footwear - new, excluding military and orthopedic

863 - Movie film - exposed and developed

864 - Watches and clocks, including parts

891 - Sound recorders, musical instruments etc.

892 - Printed matter

894 - Baby carriages, toys, sports goods etc.

896 - Artworks, collectors pieces and antiques

897 - Jewelery and related articles

941 - Animals

3.3.15 The value/weight ratios of trade between all FALAC countries and the United States (at the 3 digit level of classification) were computed. Despite some anomalies, high air penetration in a commodity was associated with a high value per unit of weight.

3.3.16 Air still accounted (in 1967) for a very small overall share of total United States trade with FALAC countries.

	US Imports percentage by Air		US Exports percentage by Air	
U.S. Trade with:	value	weight	value	weight
Argentina	9.05	0.12	6.24	0.15
Bolivia	5.83	0.00	6.55	0.25
Chile	0.71	0.00	3.72	0.12
Colombia	3.85	0.01	9.85	0.47
Ecuador	2.02	0.05	3.79	0.24
Peru	0.73	0.02	7.41	0.32
Venezuela	1.39	0.00	18.16	1.23
All FALAC	2.19	0.00	10.32	0.54

3.3.17 The analysis also revealed a large number of commodities which although they have a high value in relation to their weight, are still predominatly being carried by surface. Selected examples include:-

Country	Commodity	Total Value/Weight $ per lb.	Percentage Carried by Vessel by weight	by value
	U.S. Imports from:			
Bolivia	Inorganic chemicals	6.137	100%	100%
Chile	Base Metal Manufactures	5.400	100%	100%
Ecuador	Unmanufactured tobacco	2.813	92.5%	98%
Peru	Inorganic chemicals	3.891	100%	100%
"	Textile Fabrics	5.422	100%	100%
Venezuela	Metal Working Machinery	3.334	100%	100%
	U.S. Exports to:			
Argentina	Synthetic Organic Dyes	2.482	97%	95%
"	Leather Manufactures	3.977	100%	100%
"	Table Flatware & Cutlery	4.85	95%	95%
Colombia	Exposed Movie Film	5.484	82%	68%
Ecuador	Watches and Clocks	6.499	75%	77%
Peru	Electrical Medical Apparatus	4.503	93%	79%

Such items could well be considered as potential for air freighting.

3.3.18 However, even at the relatively finely broken-down three digit level, there is clearly a wide distribution of value/weight ratios within some commodity classification.

3.3.19 Most of the air cargo trade of the region is directed to and from the United States.

3.3.20 The directional imbalance of this air cargo trade of the region is coupled with, and related to, a commodity imbalance of total trade. Trade in high value manufactured goods is very much southbound. For the foreseeable future this commodity imbalance will continue. The best opportunity of developing export air trade from the FALAC countries appears to be in perishable goods.

3.3.21 One urgent task of any new organisation of the FALAC type will be to set up a mechanism for the co-ordination and pooling of market studies into those commodities which by virtue of their high value, or other special features, particularly perishability, offer the best opportunities for air freight.

3.3.22 Some useful studies have already been completed, in particular by the export promotion units of some FALAC country Governments. Valuable as they are, many of these studies do not take account of possible changes in marketing and distribution systems, being concerned largely with the likely load of total demand in various markets, and the problems of production in the exporting country. Relatively few of these export market studies concerned commodities which are likely air candidates at any foreseeable level of air freight rates.

3.3.23 Much will be gained by a closer co-operation between airlines and forwarding agents on the one hand, and producers, buyers, and Government planning agencies on the other, to ensure that the inputs represented by air and other transport modes are fully evaluated in such market studies.

3.3.24 There is a clear need for market studies for the main FALAC markets, United States, Panama, Europe, for the following commodities:-

- Beef prime cuts
- Mushrooms
- Cut flowers
- Pyrethrum extract
- Shrimps
- Lobsters
- Strawberries
- Grapes
- Live zoo animals, birds and fish
- Hides, skins, and leather products

% By Weight of Selected Commodities - by Route within Airline. Based on samples of Air Waybills for March and September 1968.

		Commodities														
Route	(From - To)	0001 Meat	0515 Grapes	0311 Fish	5419 Drugs	2827 Flowers	2110/3/5/6/8/9/20 Leather	89..... Printed Matter	8630/1/2 Films	9399 Personal Effects	0,4,1 Other	2,3 Other	5 Other	6 Other	7 Other	8,9 Other
North	Bue-Nyc	4.6	54.6	-	1.0	0.3	13.7	1.1	0.4	0.3	1.3	0.8	0.4	19.9	1.1	0.4
	Bue-Mia	-	-	-	-	-	-	2.0	5.1	23.5	-	-	16.3	67.3	-	5.1
	Bue-Scl	-	-	-	5.6	-	-	57.0	-	7.3	0.6	-	13.8	2.0	12.8	-
	Bue-Asu	-	-	-	-	26.2	-	73.8	-	-	-	-	-	-	-	-
	Bue-Ros	-	-	91.3	0.02	-	-	0.03	0.07	0.29	8.2	-	-	0.0	-	0.0
	Bue-Lse	6.0	-	-	0.8	-	18.5	0.4	1.5	19.9	16.0	15.5	2.4	11.9	6.9	0.03
	Bue-Beg	-	-	-	0.8	-	-	5.6	15.7	69.5	5.2	-	1.2	-	2.0	-
North	Ute-Pty	-	-	-	-	-	-	19.6	-	13.7	-	-	-	-	-	66.6
	Ute-Mia	-	-	-	-	-	-	26.9	-	31.6	14.5	0.7	-	0.8	21.9	3.7
	Ute-Mex	-	-	-	-	-	-	10.7	-	69.9	16.0	-	0.9	1.2	-	1.6
South	Ute-Lim	-	-	-	-	-	-	13.4	-	-	22.2	-	2.8	11.0	50.6	-
	Ute-Scl	-	-	-	-	-	-	3.0	-	44.5	10.2	-	-	-	39.0	3.4
North	Gye-Beg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gye-Pty	-	-	-	-	-	-	5.0	25.5	9.2	0.1	-	-	10.1	-	14.1
South	Gye-Lim	-	-	-	-	-	-	2.7	80.0	12.0	1.4	3	-	-	0.5	0.4
North	Bue-Scl	0.13	-	-	9.1	-	-	33.0	0.01	0.11	0.01	-	0.16	23.6	24.2	9.6
South	Scl-Bue	-	-	0.2	2.5	-	-	4.7	-	37.1	1.6	-	0.3	2.0	3.4	48.2
	Nyc-Scl	-	-	-	0.3	-	-	10.0	2.3	2.6	1.7	0.1	0.6	0.1	76.0	6.1
	Ord-Scl	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-
	Mia-Scl	-	-	-	0.5	-	-	3.5	0.3	15.2	9.6	0.03	0.3	13.2	51.2	6.1
	Lim-Scl	-	-	-	1.0	-	-	11.9	5.8	-	-	-	-	18.0	42.4	20.8
North	Geh-Mex	-	-	-	-	-	-	70.0	0.8	25	0.3	3.6	-	0.3	-	-
	Beg-Mia	-	-	-	-	-	-	31.3	-	38	-	30.6	-	-	-	-
	Beg-Nyc	-	-	-	4.7	-	-	54.4	0.7	8.3	1.1	0.5	-	14.4	15.3	0.6
	Beg-Pty	-	-	-	5.7	-	-	13.1	1.3	12.0	23.2	-	13.8	8.0	22.8	-
	Beg-Ccs	-	-	-	40.3	-	-	41.4	0.8	-	0.4	-	-	10.1	7.0	-
South	Beg-Lim	-	-	-	0.5	-	-	86.7	2.8	3.3	-	-	-	-	5.8	0.9
North	Rio-Lim	-	-	-	1.2	-	-	98.8	-	-	-	-	-	-	-	-
	Lpb-Lim	8.7	-	-	-	-	-	67.4	-	-	-	-	-	-	24.0	-
	Sao-Lim	-	-	-	-	-	-	0.2	-	99.8	-	-	-	-	-	-
	Scl-Lim	62.3	-	-	0.1	-	-	34.2	-	3.5	-	-	-	-	-	-
South	Pty-Lim	-	-	-	-	-	-	-	3.71	7.0	-	2.9	-	-	85.9	0.5
	Nyc-Lim	-	-	-	5.5	-	-	5.7	-	3.8	-	-	-	15.2	45.2	24.6
	Mia-Lim	-	-	-	-	-	-	-	-	-	-	-	-	-	56.15	43.85
	Lax-Lim	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-

Table 3.3a

3.4 Existing Air Penetration of International Trade Value/Weight Ratio

3.4.1 By far the most useful characteristic of commodities in general international trade, indicating suitability for air transport, is value/weight ratio. Where perishable items are excluded, for example, in general manufactured goods, we can use this single measure (value/weight ratio) to include most of the reasons for choice of the air mode for transport. Hence machinery or motor spare parts, whether as an individual shipment or as regular replacement for inventory, correlate well in their mode of transport with value/weight ratio.

3.4.2 The proportion by weight of a commodity travelling by air transport can be termed the Air Penetration Percentage. The trade statistics of many of the FALAC countries, including Peru, Bolivia and Ecuador were analysed to evaluate this Air Penetration. The analysis indicated that this penetration varies widely in Latin America not only between commodities, but between routes.

3.4.3 The extremely large variation of value/weight ratios of component commodities, within the broad commodity groups, restricts the usefulness of analysis of air penetration at the 1 or even 2 digit level of classification of commodities.

3.4.4 The trade, import and export, between all the FALAC countries and the United States (for each country the major air trading partner in manufactured goods) was analysed at the 3 digit level. Trade items at this level of detail have been reorganised into value/weight categories. This is shown in detail - Table 3.4a for U.S. exports. The broad SITC classifications have been ignored and each value/weight category contains a wide range of commodities.

3.4.5 The Air Penetration Percentage shows a clear correlation with value/weight ratio. (Table 3.4b). This is especially marked in the trade route with the best developed air transport, United States to Venezuela (See Figure 3.4a). It is also clear that apart from a few anomalies, when the quantities of goods shipped is so small as to be insignificant, the gradient of this relationship is greater on the United States to Venezuela route than on the other routes.

3.4.6 This air penetration/value/weight gradient is a function of two factors:-

3.4.7 a) The development of the route; the period over which air cargo services have been operated, the number of services, the existence of a freight forwarding infrastructure etc.

3.4.8 Miami has, for example, between 20 and 30 times the number of IATA registered handling firms than most of the FALAC capitals, and Venezuela has many more than other South American countries.

3.4.9 However this supply develops, the second factor is at least as important -

b) The inherent long-run limits of air penetration as against surface transport.

These potential limits of air penetration are now examined.

3.4.10 Total Distribution Cost

The limits of air penetration are initially considered in terms of the ratios of total distribution cost (by air and surface modes), of international trade on each route. The methodology is described in Appendix A.3.

3.4.11 This ratio for each route defines the relative potential for air transport in international trade on each route.

3.4.12 Using the data gathered in the total distribution cost study, this ratio is defined in terms of the cost of importing and exporting a standardised set of commodities to and from the FALAC countries, the United States, Panama and Europe. In general it has been assumed that transport is from Capital to Capital but in the case of the United States, Miami has been taken to be origin and destination.

3.4.13 In many of the pairs of Capitals, the surface transport particularly, involves many modes. Hence transport to and from Bogota includes a link to Barranquilla by road or air.

3.4.14 The most appropriate surface modes have been chosen. Hence from Argentina to Bolivia and Argentina to Chile,rail has been assumed to be the competing mode.

3.4.15 Examples of the largest single item, freight charges, are shown in Table 3.4c, for four routes, together with door-to-door average shipping times.

3.4.16 It can be seen that the West Coast Shipping Conference imposes very much the same rates for very different shipping distances, with, however, a great variation of rates between commodities. Air rates are much more dependant on distance with the special 'commodity rates' only applying to a minority of items on these routes. The air costs are based on ex-Miami shipment.

3.4.17 The major element in time in most cases is not journey time, but delays in seaport or airport transit sheds etc. Hence, for example, the average shipping time by air from West Germany to La Paz, Bolivia is 20 days. Most of this air freight is by Lufthansa via Frankfurt, New York, Lima with transhipment delays at New York and Lima. In this case, air transport retains its time advantage since sea transport via Arica then rail to La Paz (still the main route dispite the new rail link to the Atlantic) is shown in proportion.

3.4.18 For most of the longer routes the air freight cost was between 0.65 and 0.87 of the air total distribution cost compared to the range 0.30 to 0.62 for the surface freight cost related to surface total distribution costs.

3.4.19 The other items in the total distribution cost are shown in the Questionnaire in Appendix A.3. and almost without exception, these additional items of insurance, packaging, documentation etc. are more expensive for surface transport than for the air mode.

3.4.20 Insurance ranging from 1% to 3% of the air total distribution cost is up to 10 times cheaper than the surface insurance rate on most routes. This high difference reflects the theft risk at many of the South American ports and on rail transport links such as Arica -La Paz.

3.4.21 Examples of the total distribution cost ratios, air to sea, from Miami to the capitals of Chile, Ecuador, and Peru and to Central America, are shown below:-

(Average of Nine Standardised Commodities)

From Miami to -	
Chile	11.0
Ecuador	10.3
Peru	12.0
Central America	7.5

3.4.22 To compare with these, an average figure for this ratio on North Atlantic routes, is from 2 to 3.

3.4.23 This indicates that there is a high barrier to air cargo development on South American routes.

3.4.24 Future improvements in international transport will change costs and times and hence these ratios.

3.4.25 This ratio provides a means of evaluating these improvements and developments in terms of air potential. Such developments are considered in Section 3.5

3.4.26 Threshold Value for Potential Air Trade

The other mechanism for determining potential air cargo is in terms of a 'threshold' value/weight ratio, above which it is assumed that air freight tariffs can be borne; this without regard to competing surface modes. Such a description of potential air trade mirrors the importance of short-term financing capital in trade and freight movements in South America.

3.4.27 A commonly used figure in many studies is $2 (U.S.)/lb. This is clearly arbitary in view of the wide range of air freight tariffs between differing country pairs.

3.4.28 It has been assumed here that a reasonable minimum value/weight ratio can be determined on the assumption that commodities can bear 20% of their F.O.B. value as transportation (7% to 10% have been previously used), but the poor surface mode competition in South America clearly indicates a higher figure in terms of time.

3.4.29 The resulting set of 'threshold' value/weight ratios is shown in Table 3.4d where, for the South American countries, it is assumed that imports and exports are directed to and from the capitals of each country.

3.4.30 Clearly, for general manufactured goods, this barrier against potential by air is much higher to and from Miami for the southern FALAC countries than the northern countries but this difference is lessened on the longer extra-regional routes to and from New York and Paris.

3.4.31 Within the seven FALAC countries, extremely large differences exist in this 'threshold' for air cargo and clearly, in these terms, Venezuela is relatively isolated in terms of southbound air trade potential.

3.4.32 This threshold can be related to the air potential for trade. Table 3.4e describes U.S. imports and exports from and to each of the FALAC countries. At this point in time (1967 figures) the air weight is an extremely small fraction of the total weight of trade. Columns 3 and 5 indicate the present surface weight which is immediately potential for air shipment, under assumptions that the threshold value/weight ratios are respectively:-

a) $2/lb.

and

b) those indicated in Table 3.4d (using Miami as the U.S. destination).

3.4.33 The enormous undeveloped potential of Venezuela, particularly in imports, is striking; whereas Bolivia appears to have much smaller potential.

3.4.34 The immediately available potential for air shipments is especially great in the northbound direction to the United States, totalling 109,000,000 pounds.

3.4.35 Nearly all of this, however, 97,000,000 pounds, is associated with one country, Venezuela.

3.4.36 Columbia and Venezuela have a much greater air freight potential than all the other FALAC countries.

U.S. EXPORTS

AIR TRADE	ARGENTINA					BOLIVIA					CHILE				
Value Group $ per '000 lb	Wt.in Group ('000 lb)	% of Total Trade	Wt.by Air ('000 lb)	Air/Surface wt. ratio	Group % of Total Air Trade	Wt.in Group ('000 lb)	% of Total Trade	Wt.by Air ('000 lb)	Air/Surface wt. ratio	Group % of Total Air Trade	Wt.in Group ('000 lb)	% of Total Trade	Wt.by Air ('000 lb)	Air/Surface wt. ratio	Group % of Total Air Trade
000 - 399	140,675	55.98	522	0.004	20.03	374,501	92.07	91	-	9.77	880,623	83.75	359	-	16.37
400 - 599	9,658	3.84	215	0.021	8.25	1,189	0.29	24	0.020	2.57	2,048	0.19	22	0.010	1.18
600 - 799	47,582	18.93	422	0.009	16.19	17,111	4.20	150	0.009	16.11	71,732	6.82	199	0.003	10.73
800 - 999	833	0.33	17	0.020	0.65	10,098	2.48	58	0.006	6.22	28,333	2.69	19	0.006	10.30
1000 - 1499	27,948	11.08	436	0.015	16.73	1,934	0.47	171	0.089	18.36	40,305	3.83	426	0.011	22.98
1500 - 1999	19,023	7.57	268	0.014	10.28	-	-	-	-	-	22,030	2.09	184	0.008	9.92
2000 - 2999	2,285	0.90	267	0.117	10.24	1,520	0.37	324	0.213	34.80	940	0.08	43	0.046	2.32
3000 - 3999	185	0.07	27	0.146	1.03	54	0.01	23	0.359	2.47	2,735	0.26	58	0.022	3.18
4000 - 4999	105	0.04	10	0.095	0.38	229	0.05	38	0.166	4.08	864	0.08	118	0.138	6.36
5000 and over	3,073	1.22	421	0.137	16.16	101	0.02	52	0.515	5.58	1,838	0.17	252	0.137	13.159

	COLUMBIA					ECUADOR					PERU				
000 - 399	1,043,902	90.93	832	-	17.49	324,765	86.07	153	-	3.06	1,665,008	90.52	613	-	11.00
400 - 599	4,339	0.37	198	0.046	3.71	3,891	1.03	165	0.042	3.30	30,422	1.65	102	0.003	1.83
600 - 799	58,609	5.10	498	0.008	9.34	18,070	4.78	389	0.216	77.82	67,470	3.58	1,961	0.036	32.90
800 - 999	3,036	0.26	708	0.234	13.28	18,937	5.01	182	0.010	3.64	10,265	0.55	328	0.032	5.88
1000 - 1499	20,124	1.75	782	0.039	14.67	7,997	2.11	114	0.014	2.28	52,737	2.86	1,825	0.034	32.75
1500 - 1999	13,564	1.18	1,362	0.10	24.56	2,359	0.62	237	0.10	4.74	8,137	0.44	259	0.032	4.64
2000 - 2999	1,380	0.12	142	0.103	2.66	433	0.11	127	0.294	2.54	3,379	0.18	207	0.061	3.71
3000 - 3999	1,183	0.10	184	0.155	3.45	781	0.20	90	0.115	1.80	1,298	0.07	130	0.100	2.33
4000 - 4999	894	0.07	32	0.036	0.60	-	-	-	-	-	64	0	5	0.078	0.08
5000 and over	955	0.08	490	0.51	9.19	76	0.02	41	0.54	0.82	591	0.32	141	0.235	2.36

	VENEZUELA				
000 - 399	3,903,597	88.70	3,956	-	10.05
400 - 599	37,051	1.13	2,644	0.07	6.71
600 - 799	261,139	7.97	16,092	0.062	40.87
800 - 999	16,87	0.51	2,837	0.168	7.21
1000 - 1499	21,207	0.66	4,044	0.19	10.27
1500 - 1999	17,522	0.53	3,107	0.17	7.89
2000 - 2999	9,078	0.27	3,575	0.39	9.08
3000 - 3999	4,932	0.15	2,016	0.407	5.12
4000 - 4999	365	0.01	242	0.66	0.61
5000 and over	1,276	0.03	845	0.66	2.14

TABLE 3.4a

Percentages by Weight of Total and Air Imports to the U.S. from FALAC countries in given Value/Weight groups 1967

Value-Weight Ratio $ per lb.	ARGENTINA		BOLIVIA		CHILE		COLOMBIA		ECUADOR		PERU		VENEZUELA	
	Total Trade	Air Trade	Total Trade	Air Trade	Total Trade	Air Trade	Total Trade	Air Trade	Total Trade	Air Trade	Total Trade	Air Trade	Total Trade	Air Trade
0.000-0.399	96.9	1.8	99.4	-	99.8	0.65	99.8	45.9	99.8	63.0	99.8	54.3	99.95	47.3
0.400-0.599	2.5	5.8	0.5	-	-	1.3	0.1	3.1	0.15	1.0	-	1.1	0.05	12.9
0.700-0.799	-	0.2	-	-	0.1	23.8	0.05	26.8	-	-	-	9.2	-	31.3
0.800-0.999	-	0.3	-	-	0.1	1.95	-	1.0	-	13.0	-	3.6	-	0.7
1.000-1.499	0.3	15.9	0.1	39.2	-	0.65	0.05	4.8	0.05	15.7	0.1	10.0	-	6.6
1.500-1.999	0.1	1.0	-	9.3	-	1.3	-	-	-	-	-	14.2	-	0.9
2.000-2.999	0.1	47.7	-	4.1	-	8.55	-	10.8	-	3.6	0.1	5.2	-	-
3.000-3.999	-	0.5	-	1.0	-	1.3	-	3.6	-	-	-	0.1	-	-
4.000-4.999	0.1	14.3	-	7.2	-	16.4	-	-	-	-	-	-	-	-
5.000 and over	-	12.5	-	35.2	-	44.1	-	4.0	-	3.7	-	2.3	-	0.2

Percentages by Weight of Total and Air Exports from the U.S. to FALAC countries in given Value/Weight groups 1967

0.000-0.399	45.1	20.1	92.1	9.8	83.73	19.4	90.9	17.5	86.2	3.1	90.5	11.0	88.7	10.1
0.400-0.599	3.8	8.25	0.3	2.6	0.2	1.2	0.4	3.7	1.0	3.3	1.65	1.8	1.1	6.7
0.600-0.799	18.9	16.2	4.2	16.1	6.8	10.7	5.1	9.3	4.8	77.9	1.3	23.4	8.0	40.9
0.800-0.999	0.3	0.65	2.5	6.2	2.7	10.3	0.3	13.3	5.0	3.6	0.55	5.9	0.5	7.2
1.000-1.499	11.1	16.7	0.5	18.4	3.8	23.0	1.75	14.2	2.1	2.3	2.9	32.85	0.7	10.3
1.500-1.999	7.6	10.3	-	-	2.1	9.9	1.2	25.5	0.6	4.7	0.4	4.65	0.5	7.9
2.000-2.999	0.9	10.2	0.4	34.7	0.1	2.3	0.1	2.7	0.1	2.5	0.2	3.7	0.3	9.1
3.000-3.999	0.1	1.0	-	2.5	0.3	3.2	0.1	3.5	0.2	1.8	0.1	2.3	0.2	5.1
4.000-4.999	-	0.4	-	4.1	0.1	6.4	0.1	0.6	-	-	-	0.1	-	0.6
5.000 and over	1.2	16.2	-	5.6	0.2	13.6	0.1	9.2	-	0.8	2.4	17.3	-	2.1

TABLE 3.4b

Major Freighting Component of Total Distribution Cost
On Three Typical Routes

Sea $ per metric ton

U.S. Atlantic to:	Ecuador	Peru	Chile
Household Goods	113.40	136.25	134.25
Radios	75.50	87.60	85.00
Electrical Machinery	96.50	114.50	112.50
Electrical Spares	-	-	-
Refrigerators	69.00	83.60	79.75
Motor Parts	46.40	48.90	48.90
Textiles	-	-	-
Toilet Goods	117.08	136.25	134.00
Pharmaceuticals	117.00	136.25	134.00
Time (Days)	20	21	29

Air $ per metric ton

U.S. Atlantic to:	Ecuador	Peru	Chile
Household Goods	710.00	950.00	1,460.00
Radios	710.00	950.00	1,460.00
Electrical Machinery	320.00	400.00	600.00
Electrical Spares	710.00	950.00	1,460.00
Refrigerators	710.00	950.00	1,460.00
Motor Parts	710.00	400.00	1,460.00
Textiles	710.00	950.00	1,460.00
Toilet Goods	710.00	950.00	1,460.00
Pharmaceuticals	340.00	430.00	660.00
Time (Days)	2	2	3

Table 3.4c

Threshold Value/Weight for Potential Air Trade. Minimum Value ($ US/Kilo) for International Air Shipment

(Assumes General Rate for 500 kgs = 20% F.O.B. Value)

FROM \ TO	Argentina	Bolivia	Chile	Columbia	Ecuador	Peru	Venezuela	Miami	New York	Paris
Argentina	-	1.55	2.35	1.80	1.70	1.55	2.6	2.85	3.1	7.0
Bolivia	3.85	-	3.45	1.65	1.50	1.35	3.1	2.75	3.0	6.8
Chile	2.35	1.15	-	1.65	1.50	1.35	3.1	2.75	3.0	6.9
Columbia	6.45	3.95	5.35	-	1.60	2.85	2.50	1.50	2.25	6.65
Ecuador	6.45	3.95	5.35	1.60	-	2.3	2.45	2.3	2.4	6.20
Peru	5.25	2.05	3.95	1.0	1.0	-	2.45	2.55	2.65	6.45
Venezuela	6.80	6.45	6.85	2.55	3.1	4.3	-	0.55	2.85	6.75
Miami	8.4	5.85	7.30	2.95	3.55	4.75	2.45	-	-	-
New York	9.20	7.35	8.5	4.5	5.05	6.25	2.85	-	-	-
Paris	12.55	10.9	12.95	8.30	8.65	9.85	6.75	-	-	-

Table 3.4d.

UNREALISED AIR TRADE POTENTIAL

UNITED STATES IMPORTS FROM - 1967

Country	Present Total Weight of Trade ('000 lbs)	Present Air Weight ('000 lbs)	Surface Weight Greater than 2 $ per lb ('000 lbs) EXTRA POTENTIAL (1)	Assumed Minimum 'Threshold' Value for Air (US $ / Kilo)	Surface Weight Value Greater than Assumed Threshold Air Shipment Value (Column 4) ('000 lbs) EXTRA POTENTIAL (2)
Argentina	1,995,856	2,481	1,442	8.4	3,401
Bolivia	2,665,471	97	3	5.85	107
Chile	4,389,570	152	378	7.30	380
Colombia	6,646,500	1,300	512	2.95	5,875
Ecuador	1,567,069	912	231	3.55	231
Peru	5,087,070	1,069	1,940	4.75	1,940
Venezuela	153,680,927	11,012	3	2.45	96,992
TOTALS		17,023			108,926

UNITED STATES EXPORTS TO - 1967

Argentina	2,064,665	2,605	4,923	2.85	2,747
Bolivia	392,802	931	1,477	2.75	291
Chile	1,620,229	1,681	5,895	2.75	2,322
Colombia	1,164,568	5,228	3,564	1.50	15,766
Ecuador	651,637	1,498	1,032	2.3	1,032
Peru	1,835,600	5,571	4,849	2.55	1,961
Venezuela	3,425,391	39,348	8,973	0.55	23,488
TOTALS		56,862			47,607

SOURCE: US. DEPT. OF COMMERCE
BUREAU OF CENSUS

TABLE 3.4e

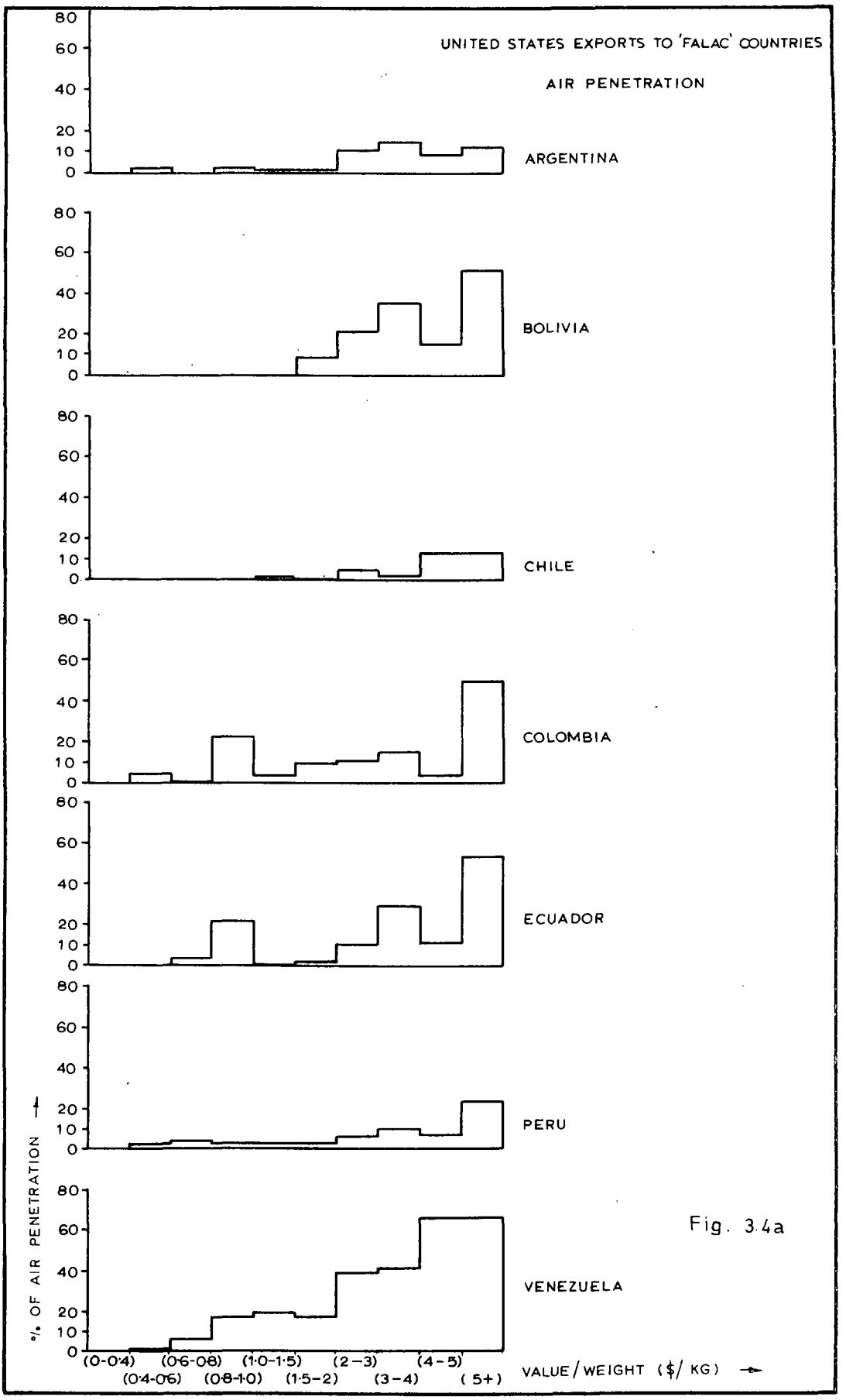

UNITED STATES EXPORTS TO 'FALAC' COUNTRIES
AIR PENETRATION
ARGENTINA
BOLIVIA
CHILE
COLOMBIA
ECUADOR
PERU
VENEZUELA
% OF AIR PENETRATION
80
60
40
20
10
0
(0-0·4)
(0·4-0·6)
(0·6-0·8)
(0·8-1·0)
(1·0-1·5)
(1·5-2)
(2-3)
(3-4)
(4-5)
(5+)
VALUE/WEIGHT ($/KG)

Fig. 3.4a

3.5 Competing Surface Transport Modes

3.5.1 By far the greatest bulk of goods will continue to be carried within, into, and out of, Latin America by surface transport for the foreseeable future.

3.5.2 Maritime transport has been dominant in the past, and will continue so, although striking highway developments are in progress. Rail networks will not be greatly extended, and unprofitable lines will be closed: railway developments will come from rationalisation and improved efficiency, but except for a few special sectors, dynamic growth is not expected. The continent as a whole plans heavy investments in transportation systems, the preponderant part of which are in surface modes. This continues a process which has been observed in the past.

Average Investment in Transport Projects
(U.S.$ millions)

Country	Years	Ports and Navigation	Road	Rail	Air
Argentina	1962-64	32.7	169.6	242.5	-
Chile	1961-65	18.8	48.3	41.4	9.1
Colombia	1962-66	5.2	40.3	14.2	3.9
Peru	1962-66	11.9	34.7	2.0	1.1
Venezuela	1963-66	11.4	141.5	-	8.0

Source: ECLA - Economic Survey of Latin America

3.5.3 An analysis by the Pan American Union of the national transportation plans of six countries (Bolivia, Colombia, Chile, Ecuador, Honduras and Venezuela) showed that airports and navigational aids (but excluding aircraft) accounted for only 4.3% of the total public investment in permanent installations. Highways accounted for by far the greatest part - 72.2%.

3.5.4 There are two obvious effects of the creation of a new, or improvement of an old, surface transport link on demand for air cargo services. The decline in domestic air cargo in some FALAC countries can be directly traced in part to the improvement of roads. In the short run, such effects appear discouraging for air freight, and make forecasting from past data extremely difficult. But the second effect is of far greater significance, and is concerned with the overall stimulus given to a country's economy by the creation of new surface transport facilities. This effect naturally bears on international air freight as well as on domestic.

3.5.5. The development plans of almost all FALAC countries are based on a substantial investment in surface transport, and in some cases the opening up of large regions of great untapped potential. Far from providing air freight services with competition, such developments are a necessary condition for the economic growth of the continent, without which the future for air freight services would be bleak.

3.5.6 Except in the creation of completely new links, surface transport improvements only dilute air cargo insofar as they substantially alter the ratio of total distribution costs in favour of surface modes.

3.5.7 From the total distribution cost studies that have been made, and studies of the changes in costs and benefits of such surface developments, it seems clear that the cash savings are unlikely to be such as to influence those relatively high value goods which are candidates for international air freighting.

3.5.8 The benefits arising from a highway investment can be briefly summarised insofar as they have a bearing on the demand for air freight. They include:-

- a higher standard of living in the area served, due to the increased productivity made possible.

- an absolute net increase in production volumes.

- facilitated movements of populations.

- due to rising production, a stimulation of demand for manufactured goods.

3.5.9 For these reasons, among others, a greatly extended network of roads will be built in Latin America over the next decades. Although some major projects are being re-examined, the need for better highways is so clear that Governments are committed to heavy programmes of road building.

3.5.10 Detailed study of modal split potential using total distribution cost has been made for specific projects, but two general points can be made. First, depending on the terrain, road distances between two points are almost invariably longer than air-route distances, a factor of around 2.25 being one estimated average for Andean regions. Therefore, comparisons of operating costs per tonne-kilometre between track and air must be adjusted accordingly, and on this basis it has been calculated (Study of Air Transport in the Americas, Pan American Union, Volume II) that modern jet aircraft will return lower operating costs than two or three axle vehicles over any mountain road, for any airline distance of more than 200 kilometres.

3.5.11 The same study estimated that vehicle operating costs in the Andean region ranged from 3 ¢ to 20 ¢ a tonne-kilometre on other trans-Andean roads. Since modern jets can offer operating costs in the range of from 4 ¢ to 14 ¢ a tonne-kilometre (see Section 4) even without deflating these rates to allow for the shorter distance by air, the cost advantages of air transport are in the competitive range.

3.5.12 However, preliminary estimates of a proposed highway from Venezuela to Eastern Colombia to Iquitos have suggested operating costs for large trailer and semi-trailer vehicles of less than 1.5 ¢ per tonne-kilometre.

3.5.13 One of the most striking international surface transport developments is the Carretera Marginal de la Selva, which will in due time open up large areas of Colombia, Ecuador, Peru, and Bolivia, affecting an estimated 1.6 million people directly, and many more indirectly, and bringing into production about 7.4 million hectares. The bulk of the benefits, in terms of estimated regional products, will accrue to Colombia and Peru, though in relation to their (1966) GDPs, the relative gains of Ecuador and Bolivia will be higher.

3.5.14

	Colombia $ m	Ecuador $ m	Peru $ m	Bolivia $ m
Estimated Regional Product at full development	58,530	23,267	60,682	21,807
GDP at market prices 1966, whole country	6,256	1,175	3,016 (1965)	182

Sources: "Transportation & Economic Development in Latin America" Charles J. Stokes

U.N. Statistical Yearbook

3.5.15 Clearly, changes of such magnitude can only take place over a very extended time scale. As at October 1967, much of the Carretera Marginal had yet to be completed:-

Carretera Marginal de la Selva - distance in kilometres

	Total Planned	Constructed Paved	Constructed Unpaved	Total and Percentage of planned construction	
Venezuela	680	365	-	365	54%
Colombia	1,455	59	364	423	29%
Ecuador	938	-	160	160	17%
Peru	2,402	47	479	526	22%
Bolivia	1,643	55	-	55	3%
Paraquay	773	-	68	68	9%

Source: ECLA; Economic Survey of Latin America, 1967

3.5.16 A development of such size will clearly have a substantial effect on geographical distribution of population, size of national product, and distribution of income. Any loss of air freight through improved road links due to the Carretera are clearly insignificant compared to air freight generated as a direct or indirect result of the project. Similar considerations apply to the other main road developments throughout the continent.

3.5.17 The state of the most important international road developments as at late 1968 can be summarised as follows:

The following highway links, which have a bearing on international freight movements, are in process of completion:

Paranague	-	Puerto Stroessner
Port Alegre	-	Paso de los libros
Petlotas	-	Chuy
Brasilia	-	Acre
Pucallpa	-	Lima
Montevideo	-	Livramento
Valparaiso	-	Las Cuevas

3.5.17 (contd.) The following highways are in the final study stage, or in the early stages of construction:

Tapon of the Darien

Asuncion - Bolivian frontier

Concepion of Paraguay - South of Lima

The following proposed highways are in the early stages of study:

La Paz	-	Paraguay
Iquique	-	Oruro
Asuncion	-	Salta - Antofagasta
Presidente Epitacio	-	Corumba - Santa Cruz
Sanquianga	-	Tres Esquinas
Brasilia	-	Livramento
Manaus	-	Cuidad Bolivar

Highways under review for possible improvements later:

Buenos Aires	-	Asuncion
Buenos Aires	-	Paso de los Libros
Pelotas	-	Jaguarzo - Montevideo
Lima	-	La Paz

Pan American system, South of Colombia and Ecuador, and North of Peru.

Highways already completed:

Buenos Aires	-	Mendoza
Pan American system	-	South of Peru to Santiago
Asuncion	-	Puerto Stroessner

3.5.18 With some exceptions, statistics on road transport tend to be fragmentary, and often confined to overall traffic magnitudes without indication of origins and destinations, or of commodity flows. The road haulage industry in Latin America is characterised by a very large number of small enterprises without any systematised reporting or central control other than in the granting of import and operating licences.

3.5.19 Since, however, decisions to put lorries into service can be assumed to be based on expanding demand, there would be a high degree of correlation between the cargo carried by lorries and the number of them in service. Actual productivity per vehicle/hour is obviously greatly affected by the type of vehicle, and the terrain and road conditions. Moreover, different operators will achieve differing utilisation of their vehicles.

3.5.20 Over the period 1960/1963, the number of lorries in use increased rapidly for all FALAC countries except Chile and Colombia (figures not being obtainable for Bolivia). Government fiscal and import control policies are obviously of importance in introducing restraints into the system.

Country	Percentage Average Annual Rate of Increase in Number of Lorries in Circulation - 1960-1963
Argentina	+ 11.4%
Chile	+ 3.0%
Colombia	+ 2.2%
Ecuador	+ 5.4%
Peru	+ 7.4%
Venezuela	+ 10.6%

Source: Transport in Latin America

3.5.21 These results are paralleled by more recent figures for the growth in total commercial vehicles:

Country	Period	Percentage Average Annual Rate of Growth in Total Number of Commercial Vehicles in Circulation
Argentina	1963-1965	+ 6.8%
Bolivia	1963-1966	+ 9.7%
Chile	1963-1966	+ 0.1%
Colombia	1963-1966	+ 5.3%
Ecuador	1963-1966	+ 0.3%
Peru	1963-1966	+ 9.3%
Venezuela	1963-1965	+ 23.8%

Source: United Nations Yearbook (Statistical)

3.5.22 Very little of the capacity represented by vehicles in circulation would be used for international movements. Certain countries require all freight loads to be carried in vehicles registered in the country, thereby causing road transhipment at borders. But the part played by road transport in international trade is of course an essential one in providing links to the ports and railheads.

3.5.23 Railways

The FALAC countries vary greatly in the extent of their past investment in railways. Argentina's very extensive network contrasts with virtually no railways in Venezuela.

Railway Track in Use in FALAC Countries
Kilometres

Country	Year	Kilometres
Argentina	1965	41,941
Bolivia	1964	3,561
Chile	1964	8,022
Colombia	1965	3,435

3.5.24 The Bulk of the traffic carried on the railways is domestic, although much is bound to or from foreign countries through the ports. In general, the railways do not provide a significant network of international connections.

International Railway Connections Between FALAC Countries

Mendoza, Argentina - Los Andes, Chile

Salta, Argentina - Antofagasta, Chile

La Quiaca, Argentina - Villazon, Bolivia

Yacuiba, Argentina - Santa Cruz, Bolivia

Antofagasta, Chile - La Paz, Bolivia

Arica, Chile - La Paz, Bolivia

Arica, Chile - Tacna, Peru

Guaqui, Bolivia (ferry) - Puno, Peru

Source: ECLA – El Transporte en America Latina

3.5.25 Changes of gauge occur at the borders at only one of the eight international connections between FALAC countries. In other cases, through shipment is prevented by changes of gauge within the country - for example on the route from Buenos Aires to Santiago there are changes of gauge at Mendoza and at Los Andes, though not at the border itself.

3.5.26 Volumes of railway traffic over international routes remain small compared to domestic traffic, the main role of railways in inter-FALAC trade being still to carry goods to the ports for carriage by sea.

3.5.27 The financial situation of FALAC country railways remains poor, due to rising costs, static rates, and increasing competition from highways.

FALAC Countries - Financial Position of the Railway Systems
1966

(Millions of national currency units at current prices)

Country	Receipts	Expenditures
Argentina	47,125	102,125
Bolivia	79(1)	90(1)
Chile	265(2)	510
Colombia	312	325
Ecuador	43	59
Peru (1965 estimates)	448	572

Source: ECLA - Economic Survey of Latin America, 1966

(1) = January-September

(2) = Northern and Southern networks only

3.5.28 Increased co-ordination and integration of railways in the FALAC countries can be expected as the Latin American Railways Association (ALAF) becomes increasingly active.

3.5.29 However, it cannot be expected that this co-ordination of unprofitable national systems will make any real impact on the competitiveness of rail for the international transport of manufactured goods.

3.5.30 Shipping

Likely future developments in shipping are considered from the point of view of containerisation later in this same section. Traditionally, virtually all international trade of FALAC countries has been carried in ships; and sea and river transport will remain the dominant modes for the foreseeable future.

FALAC Countries (excluding Bolivia) - Percentage by Weight of Foreign Commerce Carried by Boat - 1962

Country	Exports		Imports		
	Millions of tons By Boat	Percentage of Total	Millions of tons By Boat	Percentage of Total	Percentage of Total (1) Foreign Commerce
Argentina	11.7	98%	7.3	96%	97%
Colombia	4.8	89%	1.2	91%	89%
Chile	9.3	100%	2.8	97%	99%
Ecuador	1.1	99%	0.5	99%	99%
Peru	8.7	100%	2.1	99%	100%
Venezuela	171.2	100%	2.3	100%	100%

(1) = including duplication

Source: ECLA - El Transporte en America Latina

3.5.31 With the exception of Peru, planned investment in ports and shipping is a relatively small part of overall transportation plans, and indeed only small increases in main merchant fleets for the FALAC countries have been observed in recent years. The total deadweight tonnages of the main merchant fleets of Argentina and Venezuela declined between 1962 and 1966. National plans of five FALAC countries plus Honduras indicate that around 4.7% of total fixed transportation investment is allocated to ports and rivers, comparable with 4.3% for airports and navaids.

3.5.32 Port developments will be mainly concerned with modernising and improving existing facilities rather than the creation of completely new ones. An exception is, however, the proposed new deep-water port for Argentina, due to the draft limitations at Buenos Aires. However, recent improvements in port efficiency at Buenos Aires suggest that it can handle all the traffic likely to be forthcoming in the next few years at least.

3.5.33 Peru's port facilities will be substantially improved by new investments at Paita, Pisco, and Matarani and in Chile work is proceeding at San Vicente and Valparaiso, in addition to the developments at Arica, and the rebuilding of Puerto Montt.

3.5.34 Colombia plans improvements at Buenaventura, Tumaco, Santa Marta, Barranguilla, and Castagena. Improvements in mechanised handling, such as those proposed for Callao and Guayaquil are essential forfuture foreign trade.

3.5.35 In addition to planned physical and operational improvements in port facilities, the movement towards greater maritime integration and co-ordination of shipping policies is likely to lead to an all-round improvement in efficiency. This, in turn, should eventually lead to somewhat lower shipping rates, but reductions in formalities and faster handling procedures are likely to have a greater effect on total distribution costs than modest rate reductions alone.

3.5.36 Of special interest to FALAC are the provisions of the ALALC Water Transport Agreement, and the proposed establishment of the "Linea de las Americas", since, like FALAC, these represent attempts by various forms of integration to compete effectively in the future with well-developed foreign operators.

3.5.37 Containers

The competitive position of air freight has to be evaluated in the light of three new technologies in transportation; palletisation, containerisation and "LASH" (Lighters Aboard Ship). The first two have their counterparts in air freighting , although the application of these techniques is likely to be considerably different for air transport as against surface.

3.5.38 The introduction of container-ship services has caused some changes in a number of established ocean trade routes. Traffic in sea containers over the North Atlantic, for example, is increasing steadily and it is expected that the number of routes served by regular container-ship services will grow rapidly. For example, a recent study of Genoa port suggested that the number of container line routes from there should rise from three in 1969 to eleven in 1975. However, the new techniques have so far had little impact on trade to, from and within, Latin America as a whole with the exception of some commerce to and from Brazil and Argentina.

3.5.39 Although it has been estimated that about 80% of all general cargo moving around the region could technically be carried in containers, by 1967 even a relatively "container-minded" port such as Guyaquil was only handling about 2% of its total through-put in containers.

3.5.40 FALAC country shipping-lines have been slow to introduce regular container-ship services, with the exception of Gran Colombiana. The Chilean State Railways are believed to be considering a daily container service between their seven major cities, and there are proposals to build a container port north of Valparaiso.

3.5.41 The advantages and disadvantages of containers have been exhaustively studied in recent years, and only need re-examining in the light of their probable bearing on air freight development, and specifically in this study, on the total distribution costs of the competing modes. It is therefore important to distinguish between those features which are common to containers regardless of their mode of transport, and those which have a very different effect for surface than for air transport.

3.5.42 The full potential cost savings of containers can only be realised if the whole distribution system is designed around their use. This entails a very large investment, not only in container-ships, container terminals, and the containers themselves; but also in suitable road and rail vehicles, intermediate handling equipment, inventory control systems, and the development of modern distribution management techniques.

3.5.43 At present, containers in Latin America tend to be treated in the traditional manner, in effect merely as expensive packing cases. A serious limitation to the increased use of containers is the very cumbersome customs procedures which are still in operation in some FALAC countries; for example, it is not at all uncommon for containers to be emptied for inspection en route; and the containers themselves are in some cases liable for duty. It is to be expected that this last anomaly will be eliminated in due course, in line with the European Geneva Convention of 1956. The recommendations of the ICAO Chicago Convention provide for air containers to be admitted temporarily free of duty, but for each signatory country "subject to compliance with their respective regulations".

3.5.44 Under present Latin American conditions, characterised by a general lack of integrated sea-road-rail-river container facilities, the cost advantages of surface containers are likely to be small, and will accrue almost entirely to carriers, and will be passed on to shippers only to a very limited extent. Savings to the final consumer of 6% due to the introduction of containers, which were estimated for the North Atlantic in 1963, do not seem attainable for Latin America except in a few specialised fields. Indeed, the ocean transportation component of total distribution costs may actually be increased through the use of sea containers. It is therefore arguable that where conditions do not permit the non-transportation advantages of containers to be fully realised, the result of their introduction could be an overall <u>increase in total distribution costs</u>.

3.5.45 Of significance to the competitive position of air versus surface transport are the likely changes in the structure of transport rates arising from the increased use of containers. Whereas shipping rates have been characterised in the past by a complicated tariff based largely on the value of the commodities, and hence their ability to bear particular transportation charges, the coming of containers will tend to bring in a new structure of rates, based more on volume and weight than upon value. Even if the overall <u>average</u> level of rates remains the same, such a change could mean an effective reduction in the rates for high value goods, which are the only kind of goods likely to be attracted to air freighting.

3.5.46 Bearing in mind that transportation costs are a small part of total distribution costs, the implications of this change could still be quite serious for air freight if it appeared that containerisation was likely to become a dominant feature in Latin American trade.

3.5.47 The reasons for believing that this is unlikely are as follows:-

- very heavy investment is required in ports, ships, roads, railways, etc. and in the accelerated obsolescence of non-container ships. It is likely that most FALAC countries have higher priority investments which will preclude this.

- the full potential of containers can only be realised if the container ports are backed by a compatible land, or river, distribution system. Few Latin American road networks can efficiently accommodate trucks carrying 40 foot containers, and even the very substantial investment

- containerisation investments only become viable at traffic volumes which far exceed those observed in Latin America at present. Only very few routes show volumes which approach those appropriate to container traffic, as demonstrated by the following table:-

Inter-FALAC maritime traffic of general and refrigerated cargo
1964 (thousands of metric tonnes)

FROM						
Argentina	-	80	15	7	33	43
Chile	69	-	6	2	34	2
Colombia	32	-	-	8	138	9
Ecuador	-	30	14	-	13	-
Peru	47	131	16	6	-	21
Venezuela	91	16	22	-	13	-

Source: ECLA

- even the major maritime trade flows between FALAC countries and their main trading partners in North America and Europe, though much bigger than the intra-FALAC flows, are still small compared to major world trade routes.

- the road haulage industry in Latin America, on whom the success of containerisation must to some extent depend, is not organised or equipped to take advantage of the potential cost savings.

- labour problems are likely to recur, and for some countries could form a serious impediment to full scale containerisation, as they already have for at least one FALAC country port.

3.5.48 It seems clear, therefore, that any future air freight service should not find its competitive position vis-a-vis surface transport adversely affected for at least another ten years.

3.5.49 Containers and Air Freight

On the other hand, air freight is in a better position to take advantage of the benefits of containerisation, even without compatibility of the containers themselves between different modes. However, the cost advantages of containerisation are relatively less for air transport than for surface transport since time costs, insurance, pilferage, and breakage costs, all of whom should be lowered by containers, are already a relatively small part of total distribution costs by air as compared to those by sea.

3.5.50 The exception is handling costs, and again the potential savings in these through the use of containers can only be realised by heavy investment in handling facilities and in air freight terminals. Without such investment, the effect of the introduction of air containers is mainly to shift some handling costs from the carrier to the shipper. These in turn require substantial volumes to justify them, and the demand forecasts in Section 3 indicate that even at the high rate of projected growth, air freight volumes by 1975 will only support heavy investment in ground facilities at a few airports - the FALAC capitals plus Guyaquil and Barranquilla.

3.5.51 World-wide, an increasing volume of air freight will be carried in containers over the next decade. But only the very large aircraft (for example the Boeing 747 and the Lockheed L.500) could accept the large sizes of container on which the most optimistic estimates of cost savings have been based. For the FALAC airlines, the acquisition of very large aircraft, when demand volumes justify, is the only way to secure the potential increased profitability which containerisation can bring. But until at least the mid-1970's the volumes of goods carried by FALAC airlines in containers is likely to be small. However, their gradually increasing use will provide a stimulus towards changes in the air freight industry already noted in other parts of the world, in the direction of greater consolidation of shipments, growth of the consolidator business, and the increasing emphasis among airlines of wholesale rather than retail cargo capacity.

3.5.52 There are doubts as to whether containers will greatly affect general patterns of air trade even when the very large freighters such as the Boeing 747, are in regular operation. They will be used successfully for a number of specialised markets, but their general use seems doubtful for the following reasons:-

- the tare weight of intermodal containers will be too heavy to permit their economic carriage by air, particularly over long-haul routes, where payload becomes weight-limited. Present surface containers average between 3 and 6 lbs per cubic foot of contained volume, whereas the present free tare weight allowance is 1.5 lb/cu. ft.

- lightweight air containers are likely to be too expensive for large scale use. Their use on a limited scale will not permit economies arising from fully mechanised systems.

- use of containers tends to transfer handling costs from the carrier to the shipper. Apparent handling cost reductions may therefore be misleading, and this element of total distribution costs may even be raised, due to the difficulties of stuffing containers.

3.5.53 On balance, therefore, it seems that a revolution in air cargo handling is not to be expected from containers under the conditions prevailing in FALAC countries.

3.5.54 On the other hand, very much greater use of pallets and igloos can be expected. Pallets have the advantage over containers in that:-

- they cost less
- they are ligher (equivalent on average to about 1 lb/cu.ft.)

3.5.55 Igloos have many of the same advantages as pallets, possibly to a slightly less degree. But they have the advantage that they tend to permit a more efficient use of aircraft space through loading right out to the walls. Loading time may, however, be longer with pallets on account of the more limited access.

3.5.56 Goods are being transported by air in containers to and from FALAC countries at the present and certain shippers have been able to make significant improvements in distribution. This trend will continue, but no kind of "container revolution" should be expected unless a new rate structure emerges which virtually forces shipments into containers.

3.5.57 The "LASH" system (Lighters aboard ship) is very new, and as at May 1969 the first ship completely designed for this type of operation was about to go into regular service. In this case, the lighters each weigh about 80 tons, and are loaded on and off the mother ship entirely by the latter's own equipment. The LASH system offers special advantages to developing countries in that it can provide a very flexible service with the minimum of investment in fixed ports. It is too early to say what the implications of the system are likely to be for Latin America, but certainly a number of people with long experience of shipping around the continent expressed the view that LASH ships had much greater potential there than container-ships. The proposed new deep-water port for Argentina might for example be re-examined in the light of experience of actual LASH ship operations.

3.6 Potential for Developing Air Cargo in Particular Commodities

3.6.1 A very high proportion of air cargo traffic in Latin America is in terms of a very few commodities. Way-bill analysis shows that much of the traffic (up to 70%) is 'commodity traffic', transported at special rates available for certain categories of goods.

3.6.2 This concentration of commodities reflects the composition of trade. In general, the FALAC countries import manufactured goods and export raw materials and unprocessed agricultural commodities.

3.6.3 The southbound traffic from the United States and the imports from Europe cover a wide range of goods; the traffic between FALAC countries, and from the FALAC countries north to the United States and Europe, is mainly of high value/weight, or else is perishable including both agricultural - particularly horticultural - commodities and 'perishables' newspapers etc.

3.6.4 In the air component of international trade, the major potential for development lies in the high value range of these agricultural items. These represent items which are not part of the 'general' international trade pattern; the movement could not exist without air transport.

3.6.5 Development of agricultural products in new international air cargo will be dictated by market demand, transport costs and possible developments in supply.

3.6.6 Air Transportation Costs and Markets

The Total Distribution Cost questionnaires revealed that, in general, for agricultural perishables, basic transportation cost is between 15% and 40% of the retail price; packaging and distribution also having higher percentages of the retail price than the basic supply cost.

3.6.7 The identification of new markets in relation to possible export supply countries must start by considering transport costs, and retail market prices of perishable foodstuffs in a range of possible consumer countries.

3.6.8 Figures 3.6a and 3.6b indicate the minimum retail prices, at a range of distances from the source of supply, which would be necessary to support air transportation costs. Figure 3.6a indicates this relationship for typical existing low cost cargo aircraft (DC-8, B707-320C) and Figure 3.6b for the B747, typical of the next generation of cargo aircraft. It is assumed that these costs must represent the absolute minimum of tariffs. We are assuming 50% load factors, 9 hours per day utilisation, and total operating costs at 150% of direct operating costs (this last is approximately valid at ranges over 500km, see Section 4.)

3.6.9 Hence for the haul from Buenos Aires to Rome (11,177 kms), even with a minimum of 60% of the total retail price being non-transport costs (40% being transport costs), air freight potential is indicated only for commodities selling at more than $1.80/Kilo for existing aircraft and $4.80/Kilo is a more realistic minimum.

3.6.10 As a comparison, the maximum seasonal retail prices of common fruits in France are:-

Lemons	53	cents/kilo
Oranges	40	" "
Grapefruit	35	" "
Apples	61	" "
Pears	61	" "

Source: UNCTAD-GATT

Report Fresh Fruit in seven European countries, (Geneva 1968).

3.6.11 But a more promising situation exists in more perishable items. Hence in the United Kingdom market out-of-season wholesale prices are typically:-

Strawberries	$ 3.10 kilo
Asparagus	$ 3.00 kilo
Carnations	$ 1.32 dozen
Roses	$ 3.00 -$ 3.60/stem.

3.6.12 Seasonal effects: Prices of horticulturals are extremely seasonal. Sophisticated markets are now demanding continuous supply of fresh produce. Seasonal prices now tend to reflect the costs of air transportation from widely differing areas of the world.

3.6.13 South America and the FALAC countries cover a wide range of climatic and seasonal conditions. The large US imports of grapes peaking in April (see Exhibit II)
between Chile and Argentina and the US. This is also shown in the imports of fruits and fresh vegetables but in this case there is strong competition from countries to the north (see Exhibit II)

3.6.14 Competition between Supplier Countries

Several airlines have expressed a desire to expand their northbound trade in horticulturals. Two long term factors are important:-

1. The advantage of seasonal differences with sophisticated markets in the northern hemisphere.

2. Physical nearness to these markets i.e. lower transport costs.

3.6.15 Distances from New York (the major market for final consumption of horticulture) to Latin American supply points illustrate this second factor:-

NEW YORK to	BARRANQUILLA	3,312 Kms.
	GUYAQUIL	4,800 Kms.
	LIMA	5,865 Kms.
	MARACAIBO	3,340 Kms.
	SANTIAGO	8,341 Kms.

3.6.17 For those products where a number of countries are possible suppliers to the northern hemisphere markets (such as shellfish, tropical fruits etc.), there will always be an inbuilt advantage of Central American over South American countries and northern over southern countries within South America. Hence Panama and Mexico will continue to dominate the US imports of shellfish etc. and attempts to open new sources of supply in Peru etc. will always be restricted.

3.6.18 In the short term, development of agricultural supply is all-important. The air transport costs of these agricultural commodities will only be borne by the highest quality produce coupled with sophisticated packing.

3.6.19 In many of the South American countries wishing to expand air freight, the agricultural suppliers do not produce the right quality of produce and more importantly, the supply infrastructure - collection, grading, packing - has not yet been built up. Inevitably there will be a lag in such development and the patterns of supply are likely to be undisturbed for the next five years and, for example, Chile is likely to continue to be the dominant supplier of early season grapes to the United States.

3.6.20 Air Freighting of Meat

In addition to horticulture, fresh meat has been generally advanced as a possible major point of expansion of air freight in Latin America.

3.6.21 Argentina now exports more than 9,000 tonnes of meat by air, (9,052 tonnes in 1968, compared to total meat exports of 535,420 tonnes). Value/weight ratio provides no clue to undeveloped potential for air shipments. The value/weight ratio of present surface shipments, 0.625 $/Kilo, exceeds that of the air shipments, 0.489 $/Kilo.

3.6.22 Markets for Meat

The major markets for Argentinian air shipments are Santiago (3,365 tonnes) and Lima (4,748 tonnes), (this latter also importing from Columbia), and on a much smaller scale, a recently developed Swiss market (579 tonnes). Both Chile and Peru indicate programmes of import substitution in this area, but in spite of the meatless days these are very long term measures. The U.K. market is now closed to all boned meat. The United States is also a closed market.

3.6.23 Meat Supply Developments

Apart from the substitution programmes of certain countries, the major development project concerns the development of the Santa Cruz and Beni regions of Bolivia as meat producing areas, with Peru as an indicated market. Detailed development studies for the Bolivian Government have included the possible air freighting of meat directly to Lima. (Minimum air freight costs are as indicated in Table 3.6a.

3.6.24 The comparative air freight costs already indicate a potential for air freighting meat from Santa Cruz to Lima but at the expense of the Buenos Aires - Lima trade. (In fact meat is presently being transported from Buenos Aires to Lima at six cents/tonne km (the existing commodity rate). However, this project is certainly not likely to be a major factor in the near future. The Mendoza-Santiago meat trade has not been considered in the forecast since:-

a) This is a charter operation

and

b) This is likely to be affected by the new all-weather highway.

3.6.25 B.I.D. Studies indicate annual average growth rates of 3.9% in demand for meat in Latin America between 1965 and 1980 allowing for the population and income projections.

3.6.26 Expansion of the air trade in meat is limited by the distinct market for fresh as opposed to chilled or frozen meat, as sea transport is very much cheaper. On the U.K. market for example, the home-killed wholesale price only exceeds the "imported" chilled price by, on average, 3 cents/lb.

3.6.27 Hence, similarly within Latin America, major growth in meat consumption is likely to be met by the development of sea transport.

3.6.28 In Europe, the major outlet for premium price fresh meat, retail prices of $7.00/kilo upward indicates air freight potential and indeed air freighting to Italy and Switzerland of boneless high grade meats is already substantial.

3.6.29 However, falling meat sales to E.E.C. as well as Britain reflect an import discrimination which is likely to be part of the future pattern.

3.6.30 These will accentuate the total transport cost differences with other competing sources, for example, non-E.E.C. European countries. Although expansion to Europe of air freighting of boneless meat must be part of the long-term picture, this will be limited.

TRANSPORT COSTS FOR INTERNATIONAL MEAT MARKETS

FROM	TO	Distance Km	AIR FREIGHT COST IN CENTS (US) PER KILOGRAM		
			B707/DC-8F	LH-100-20	B747
			at 6.6 cents per tonne-km	at 10.3 cents per tonne-km	at 3.9 cents per tonne-km
Mendoza	Santiago	194	20.8	2.0	-
Buenos Aires	Lima (direct)	3,153	20.8	32.5	12.3
Buenos Aires	Lima (via Santiago)	3,605	23.8	36.1	14.1
Bogota	Lima	1,889	12.45	19.5	7.37
Buenos Aires	Rome	11,177	73.60	-	39.6
Santa Cruz	Lima	1,628	10.75	16.8	-

ASSUMPTIONS

1. 50% Load Factor
2. Utilisation LH-100-20 = 9 hr. day, B707-320, DC-8F, B747 = 9 hr. day.
3. TOC = 150% DOC = Constant for distances greater than 500 Km.
4. Bulk Loading

Table 3.6a

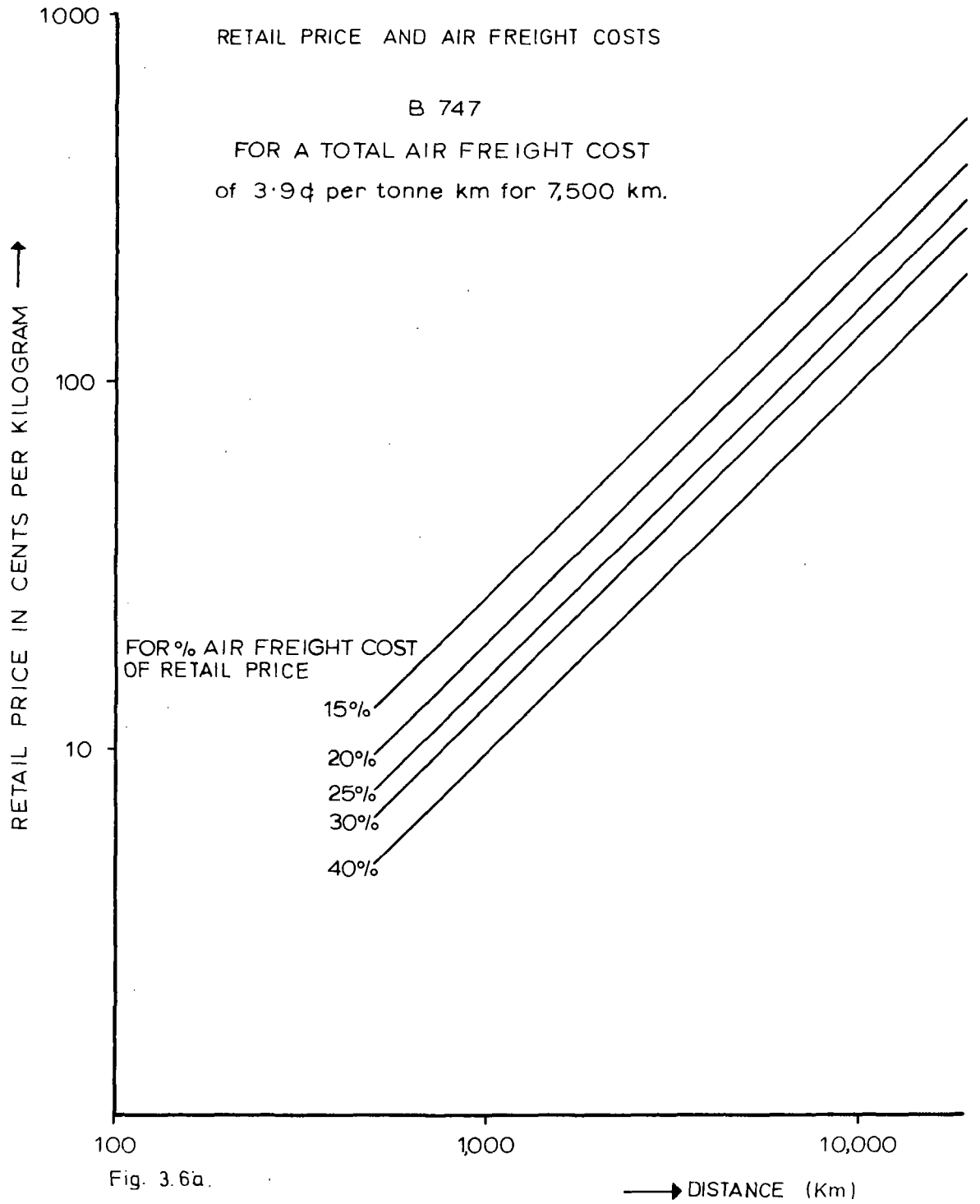

RETAIL PRICE AND AIR FREIGHT COSTS
B 747
FOR A TOTAL AIR FREIGHT COST
of 3·9¢ per tonne km for 7,500 km.
RETAIL PRICE IN CENTS PER KILOGRAM
1000
100
10
FOR % AIR FREIGHT COST
OF RETAIL PRICE
15%
20%
25%
30%
40%
100
1,000
10,000
DISTANCE (Km)

Fig. 3.6a.

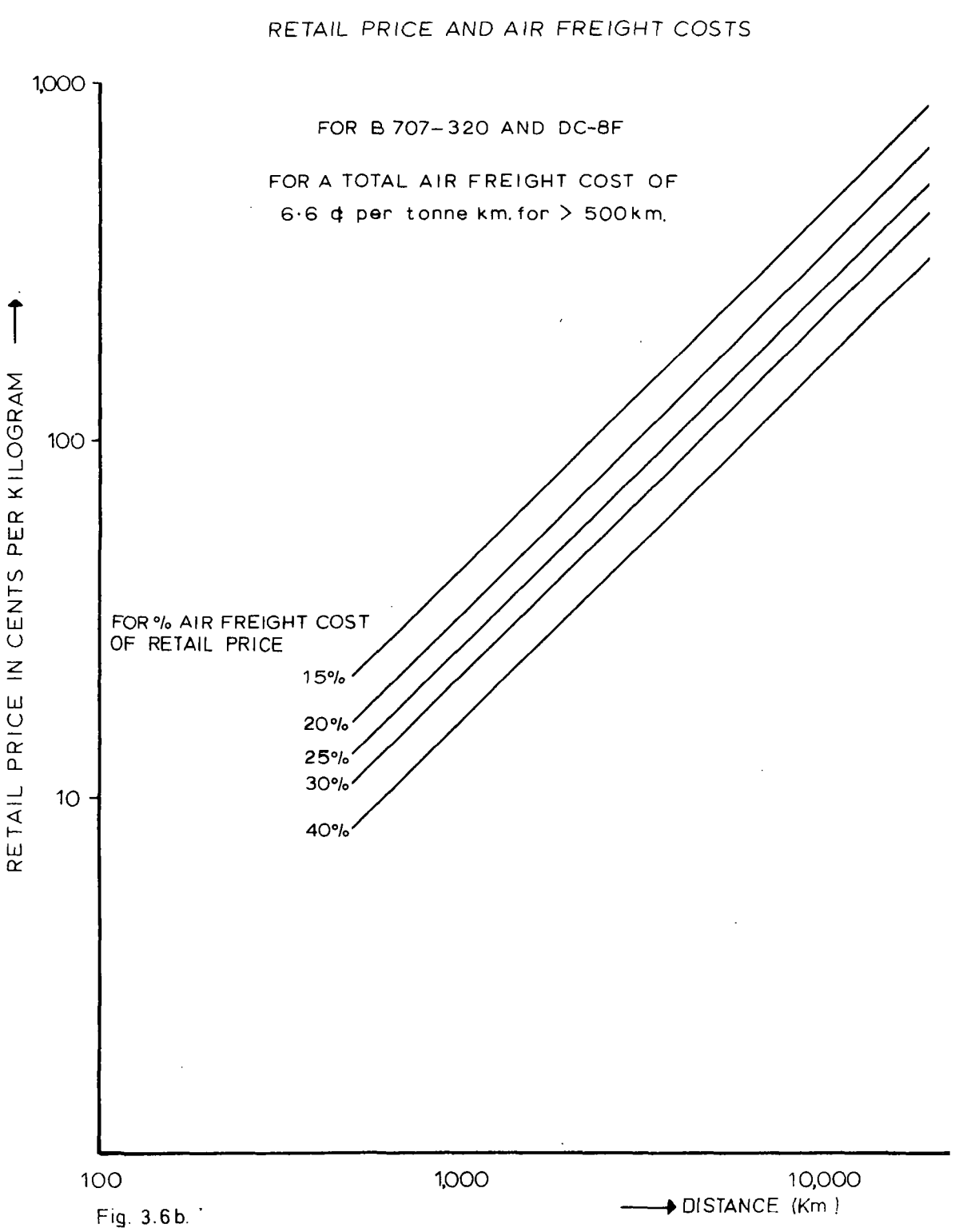

RETAIL PRICE AND AIR FREIGHT COSTS
FOR B 707-320 AND DC-8F
FOR A TOTAL AIR FREIGHT COST OF
6·6 ¢ per tonne km. for > 500 km.
RETAIL PRICE IN CENTS PER KILOGRAM
1,000
100
10
FOR % AIR FREIGHT COST
OF RETAIL PRICE
15%
20%
25%
30%
40%
100
1,000
10,000
DISTANCE (Km)

Fig. 3.6b.

3.7 Tariff Reductions and Elasticity of Demand

3.7.1 It is unlikely that there will be further reductions in overall air freight tariffs in the foreseeable future.

3.7.2 There is very little clear evidence from historical or empirical data to attempt to quantify the expansion in demand for air freight, resulting from rate reductions.

3.7.3 Studies by ITA, ICAO and most of the commercial airframe manufacturers have been made in this area. Most of these studies synthesise the estimates of elasticity from characteristics of surface cargo traffic and in particular the volumes of commodities of high value/weight ratio.

3.7.4 Professor Stanley Brewer estimates elasticities of 1.8 to 3 for South American air trade as a result of tariff reductions from present levels, and from the present studies, similar figures of 'elastic' response to rate reductions (elasticities greater than unity) are indicated on the FALAC routes. There are sufficient high value commodities presently transported by surface to expect an increase in net revenue in response to a rate reduction (see Section 3.4).

3.7.5 However, this only refers to 'potential' increases in demand. Even at the present time there is no shortage of unfulfilled 'potential' demand, on the South American routes, but the realisation of this demand relates to the long-term learning effect.

3.7.6 Certainly there will be a short-term response to tariff reductions by existing users but this will only be a small fraction of the potential demand.

3.7.7 In the short-term, tariff reductions might well result in net losses in revenue.

3.7.8 The combination of two factors:-

a. The growing realisation by the operators of these probable short-term losses, and

b. The inevitable increases in average direct cost resulting from the introduction of all-cargo aircraft have, within the past year, forced a reappraisal of tariff policies.

3.7.9 The existing commodity rates (see Section 4.1) are already extremely low and in some cases lower than total operating costs in all-freight aircraft.

3.7.10 There are strong pressures from the major operators, on a world-wide scale, for increases in basic tariffs, as reflected in the recent Athens Conference.

3.7.11 In view of this, it is considered realistic to assume that the basic tariff structure will remain unchanged for the foreseeable future.

3.8 Air Cargo Forecasts

3.8.1 For the period to 1975, the historic time series growth rates of air cargo provide an additional starting point to the forecasts.

3.8.2 Historical Time Series

Time series flows, by weight, of total international air cargo traffic have been obtained on all the major international routes linking the FALAC countries:-

a) with each other

b) with the major external points, within the region, within the hemisphere and with Europe.

3.8.3 Sources of data have included trade information by method of transport, e.g. U.S. Department of Statistics; Venezuelan 'Boletin de Commercio Exterior' as well as the Statistics of the Departments of Civil Aviation of a number of countries. Hence some data refers to total national air trade, other data to city-to-city air trade.

3.8.4 In general the origin/destination traffic of multiple points within each country have been considered. Hence Barranquilla and Bogota within Columbia and Los Angeles, Miami and New York within the United States.

3.8.5 The number of years for which data is available varies from six, (1962 to 1967) in the case of cargo flows to and from Santiago, Chile to two years data in the case of cargo flows to and from certain other countries and centres.

3.8.6 Most of the internation scheduled air trade in Latin America is through capitals. The inter-city flows were aggregated into international flows for the purposes of the forecast.

3.8.7 This data indicates extreme variability, data from differing sources showing conflicting estimates of air cargo traffic on the same route.

3.8.8 No origin/destination data was available for Bolivia, only total international traffic flows by sector of entry-exit e.g. La Paz - Lima. Also, no such data was available from Argentina.

3.8.9 Estimates were made for the missing pairs consistent with the total air imports and exports of these countries, and known trade distributions. Conflicts in the reported figures were resolved in the same way, and by estimating the reliability of differing sources.

3.8.10 High variability also occured in the year-to-year air cargo traffic figures of certain routes. This is quite distinct from air cargo growth in other parts of the world which is usually continuous. The variation in air traffic on these FALAC international routes is highly correlated with equivalent variations in total trade. The highly varying trade flows in South America in recent years have been a major determinant of international air trade.

3.8.11 Using the time series data, forecasts were made for each origin/ destination pair, but because of the restricted time series and the total trade fluctuations not much reliance can be based on these simple extrapolations.

3.8.12 Resulting Forecast of Air Cargo Demand

The final forecasts used in the report assess the air penetration potential on each route, relate this to the forecast of total trade, and incorporate an assessment of the likely degree of 'learning'. This latter indicates the probable rate of growth of:-

1. Infrastructure in air cargo operations

2. Acceptance by shippers of the total cost advantage of the air mode.

3.8.13 Mendoza to Santiago meat exports are ignored for the purposes of this forecast but meat exports to Peru are assumed to continue and grow from the present rate. It is assumed that the low commodity rate for meat on this route will remain. Potential for some meat exporting to Europe is considered in the upper forecast for 1975.

3.8.14 The final forecasts in Tables 3.8a and 3.8b reflect this analysis. Two forecasts are made for 1975 covering the likely range and the upper forecast shown in Table 3.8a. A single forecast for 1980 is shown in Table 3.8b. Summaries are shown in Figures 3.8a and 3.8b.

3.8.15 Typical industry growth rates in air trade represented by these origin/ destination forecasts are between 14% and 25%. These growth rates are smaller than the growth rates for certain of the FALAC airlines in the past eighteen months. Sector growth rates for some airlines have ranges up to 70%. However, in terms of long-run probabilities of industry growth, such individual figures must be treated with caution since:-

a. These figures represent individual airlines increasing their market shares.

b. Extremely high fluctuation in growth rates are part of the past pattern, will occur again, and are no real indication of long-term growth.

Certainly higher growth rates are possible but for realistic planning purposes, the balance of probabilities must rest with these rates of the forecast.

3.8.16 Venezuela is seen to dominate the air cargo trade of the FALAC countries with the single international trade route to the United States, while still being a major air trade partner of the Central American and European regions. Venezuela air trade within the FALAC countries is much less dominant.

3.8.17 Directional Imbalance of Air Cargo

It is clear that the strong extra-regional directional imbalances of air trade, although diminishing, will continue to be part of the basic pattern, with the U.S. FALAC routes exhibiting the largest imbalance. It is assumed that the proportionately greater growth in northern traffic will include the result of increasing use of weight and commodity discounts.

Directional Imbalance Ratio

To FALAC/From FALAC		By Weight	
U.S.	Central America	Europe	Year
3.6	1.2	2.9	1967
3.8	1,2	4.1	1975
3.4	1.1	5.4	1980

3.8.18 For the FALAC countries, equivalent imbalances occur within the region. Argentina and Colombia are major air exporters and Chile and Peru are importers. As Table 3.8c shows, these imbalances will continue as part of the future pattern.

Air Cargo Traffic

(kilograms)

Predictions to 1975

FROM \ TO	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela	Central America	United States	Europe
Argentina	-	364,000	14,288,000	521,000	20,000	2,834,000	468,000	1,271,000	4,452,000	241,000
Bolivia	40,000	-	508,000	64,000	13,000	1,795,000	24,000	203,000	440,000	60,000
Chile	950,000	559,000	-	144,000	134,000	5,959,000	844,000	334,000	703,000	223,000
Colombia	109,000	31,000	106,000	-	1,427,000	9,097,000	1,764,000	2,040,000	1,426,000	137,000
Ecuador	178,000	39,000	15,000	92,000	-	718,000	39,000	439,000	1,367,000	140,000
Peru	677,000	656,000	247,000	337,000	1,643,000	-	38,000	1,271,000	3,068,000	860,000
Venezuela	11,000	215,000	36,000	223,000	19,000	635,000	-	-	15,234,000	2,408,000
Central America	656,000	86,000	973,000	1,706,000	1,441,000	1,192,000	964,000	-	-	-
United States	7,128,000	1,258,000	4,947,000	6,081,000	5,008,000	16,093,000	62,388,000	-	-	-
Europe	3,200,000	555,000	805,000	629,000	177,000	1,472,000	12,956,000	-	-	-

Table 3.8a

Air Cargo Traffic

(kilograms)

Predictions to 1980

FROM \ TO	Argentina	Bolivia	Chile	Colombia	Ecuador	Peru	Venezuela	Central America	United States	Europe
Argentina	-	563,000	18,251,000	830,000	25,000	3,909,000	768,000	2,653,000	6,651,000	999,000
Bolivia	62,000	-	856,000	107,000	21,000	3,245,000	38,000	358,000	775,000	64,000
Chile	1,214,000	860,000	-	265,000	230,000	8,140,000	1,622,000	445,000	1,132,000	297,000
Colombia	148,000	44,000	192,000	-	2,626,000	15,676,000	3,392,000	2,777,000	1,942,000	140,000
Ecuador	299,000	67,000	23,000	131,000	-	1,209,000	60,000	656,000	2,042,000	240,000
Peru	1,192,000	980,000	313,000	649,000	2,821,000	-	64,000	2,140,000	5,168,000	1,377,000
Venezuela	16,000	430,000	53,000	311,000	32,000	1,070,000	-	-	19,339,000	3,200,000
Central America	980,000	116,000	1,670,000	2,676,000	2,140,000	1,919,000	901,000	-	-	-
United States	14,882,000	1,713,000	8,493,000	9,537,000	7,436,000	25,910,000	58,342,000	-	-	-
Europe	4,020,000	723,000	1,200,000	838,000	258,000	1,846,000	23,849,000	-	-	-

Table 3.8b

INTER REGIONAL AIR CARGO FLOWS

Exports Within FALAC Countries Excluding Venezuela

From	1967	1975 (high)	1980
Argentina	4,695,000	18,027,000	23,578,000
Bolivia	330,000	2,420,000	4,291,000
Chile	1,847,000	7,746,000	10,709,000
Colombia	1,158,000	10,770,000	18,686,000
Ecuador	184,000	1,042,000	1,729,000
Peru	753,000	3,560,000	5,955,000
TOTAL	8,967,000	43,569,000	64,948,000

Imports Within FALAC Countries Excluding Venezuela

To	1967	1975 (high)	1980
Argentina	394,000	1,954,000	2,915,000
Bolivia	481,000	1,649,000	2,514,000
Chile	3,537,000	15,164,000	19,635,000
Colombia	304,000	1,158,000	1,982,000
Ecuador	526,000	3,237,000	5,723,000
Peru	3,725,000	20,403,000	32,179,000
TOTAL	8,967,000	43,569,000	64,948,000

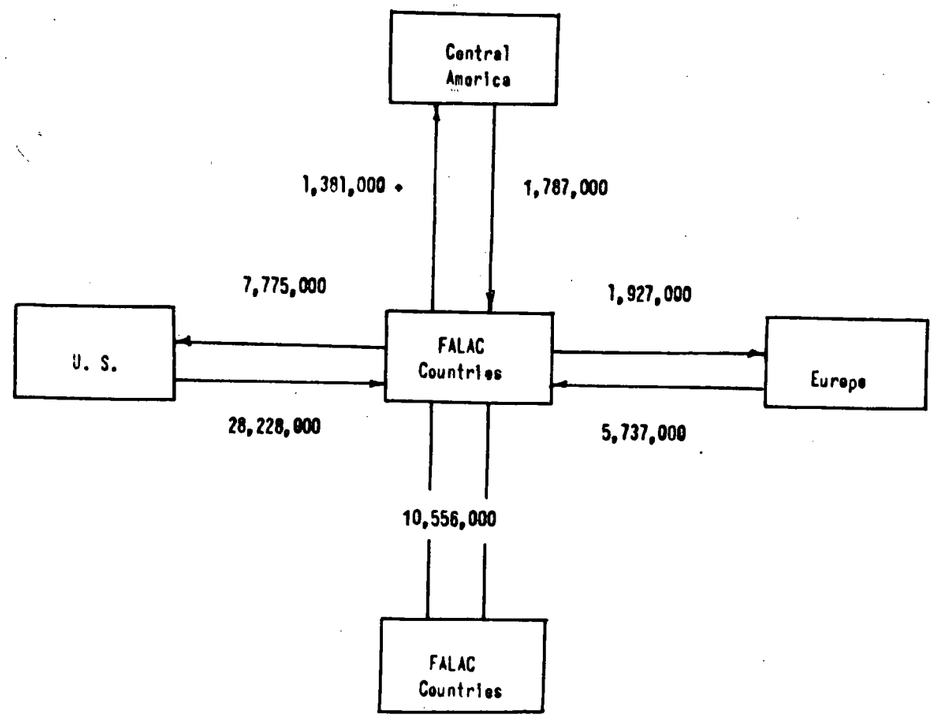
Table 3.8c

Forecast of General Scheduled Air Cargo

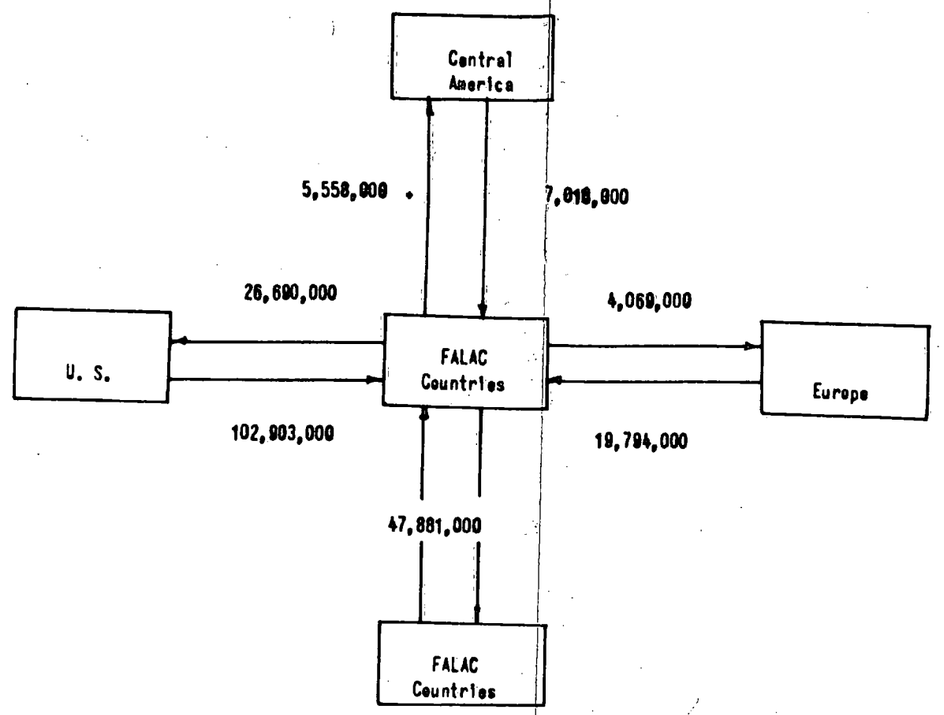
Including Venezuela

1967 - 1975 - 1980

1967



1975 (higher estimates)



1980

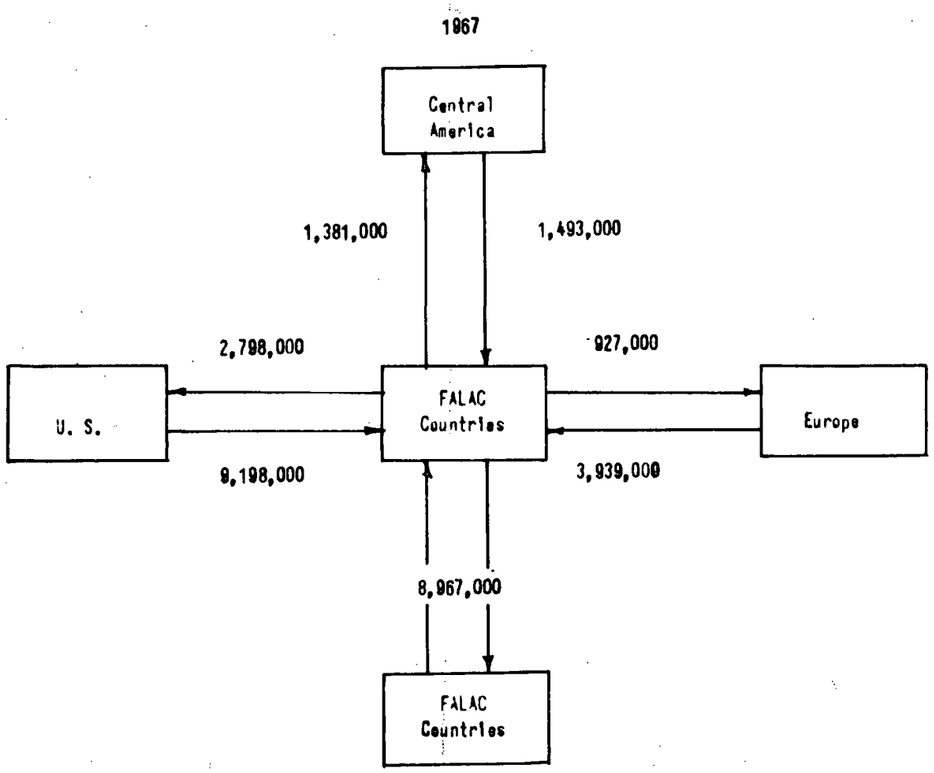
• Traffic to Central America excludes that from Venezuela.

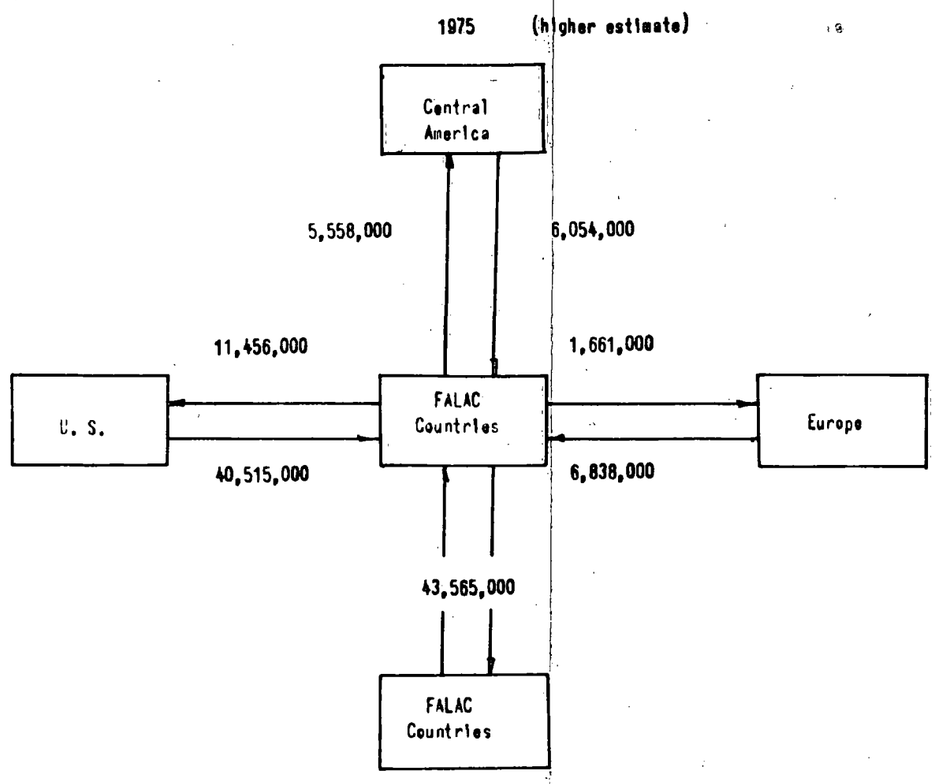
Forecast of General Scheduled Air ge

Excluding Venezuela

1967 - 1975 - 1980

(Kilograms)





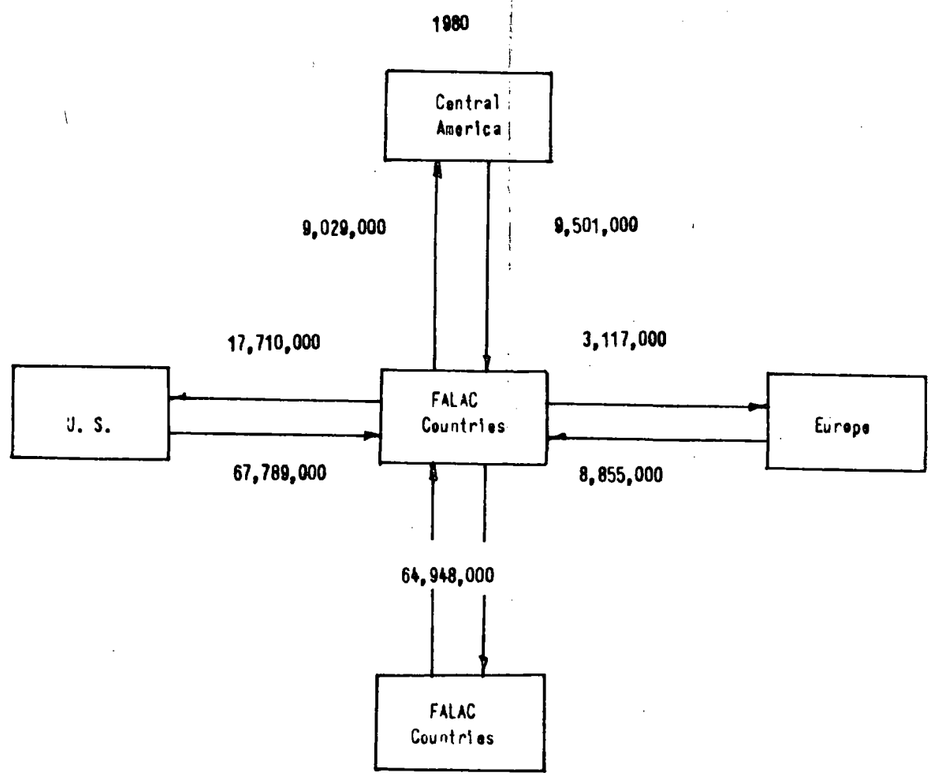


Figure 3.8 b

SECTION 4

THE ECONOMICS OF CARGO OPERATION

IN MOST OF THE FALAC AIRLINES THE CONTRIBUTION FROM THE REVENUES OF INTERNATIONAL FREIGHT TRAFFIC IS OVERESTIMATED, FOR BELLY-HOLD OPERATIONS THE CONTRIBUTION IS SMALL AND FOR EXISTING ALL-FREIGHT OPERATIONS LOSSES ARE INCURRED.

TOTAL OPERATING COST WILL INCREASE.

SECTION 4

THE ECONOMICS OF CARGO OPERATION

Index

4.1 Air Cargo Revenue

4.1.1 Rate Structure

All carriers except Ecuatoriana are IATA members and are therefore normally bound by the IATA rate structure. A few anomalous rates exist but the rate structure by and large is the IATA structure.

4.1.2 This is weight based and has the main characteristics of:-

a) a general rate for each route, covering most classes of goods transported and with that rate falling by weight size of shipment.

b) a series of special 'commodity' rates for distinct classes of goods, usually restricted to higher weight shipments and generally much lower than the general rate.

4.1.3 On the general rate system, characteristics that are clearly obvious are:-

a) the distance effect on rates; the rates falling off with increased distance. (Figures 4.1b. to 4.1e.)

b) the direction effect of the rates; northbound rates are much lower than southbound rates, at 6,000 kilometres 9 c(US)/tonne km as against 25 c/tonne km for 500 kilograms. (See Tables 4.1a and 4.1b)

c) the weight discount system which returns to the shipper the reduced airline handling costs on larger shipment sizes. (Figure 4.1a) demonstrates how this discount is much greater in the northern direction.

4.1.4 On examining the rate structure development over the past five years (Table 4.1c) it is fairly clear that in general the rate has not changed, development has been in terms of increasing the number of commodity rates and that more of these rates have been established in a northerly direction. In 1968 there are now, on average, 3.3 commodity rates/route in a northbound direction to 1.3 in a southbound direction. This rate development contrasts with the North Atlantic where no major direction effects exist, weight discounts have fallen, and the number of commodity rates has doubled in the past five years and now totals about sixty in each direction.

4.1.5 Commodity rates are almost invariably lower than the general rate. The average of the lowest commodity rates north from each of the FALAC capitals to New York is 5.8 c(US)/tonne km.

4.1.6 Although these are very few (for example compared to North Atlantic commodity rates on the FALAC routes), a very high proportion of the air cargo traffic travels on these rates due to:-

a) a rather broad commodity description

b) the natural small range of goods travelling by air (particularly as exports of the FALAC countries)

4.1.7 Southbound (from U.S.) commodity rates cover a range of manufactured goods, northbound rates and inter FALAC rates are typically perishable commodities.

Commodity Rates (See also Table 4.1d.)

Flowers

Santiago - New York	6.3	c/tonne km	N
Quito-New York	7.25	c/tonne km	N

Meat

Quito - Lima	13.5	c/tonne km	S
Quito - Caracas	21.8	c/tonne km	S
Bogota - Lima	10.6	c/tonne km	S
Bogota - Santiago	7.04	c/tonne km	S
La Paz - Lima	14.8	c/tonne km	N

4.1.8 Revenue

The cargo revenue of the carriers is determined by this rate structure and the commodities carried.

4.1.9 There is a general tendancy for cargo revenue to fall. Of the four FALAC airlines listed in Table 4.1e., Aerolinas Argentinas, Lan Chile, Avianca and Apsa, the average revenue in 1967 was 14.9 c/tonne km, and only Avianca showed an increase from 1965 of 1.8 c/tonne km. For three of these four, the average rate fell from 17.1 to 15.8 c US/tonne km.

4.1.10 On a world scale, freight rates have fallen by about 2% per year and in many other published predictions of the future situation in air freight, a continuing fall of this magnitude is assumed (see Table 4.1f). Of course these revenue figures include both domestic and international operations.

4.1.11 For Apsa the average rate fell from 17.2 c/tonne km in 1965 to 14.9 c/tonne km in 1967 and this might be assumed to be representative of international air freight for the FALAC airlines. Braniff and Pan-American (Latin American Operations) earned somewhat higher revenues of 14.7 and 15.7 c/tonne km but have exhibited a fall since 1965.

4.1.12 A major distinction between the revenues earned on the same rate structure by different airlines can be seen in terms of the aircraft used for carrying freight. All-cargo services earn a lower revenue than mixed passenger-belly-hold freight services. Cargo shipments, contract shipments, consolidated shipments, are in general only appropriate to the larger cargo capacity of all-freight aircraft. Smaller packages, often earning the minimum rate, make up a great deal of the carryings of the passenger aircraft (in general) than the airlines operating mixed passenger-freight aircraft for their passenger carryings.

4.1.13 However, this difference in revenues between all-cargo and passenger aircraft is closing.

4.1.14 For the all-cargo airlines, Table 4.1e shows that the revenues are now stationary or even rising. (The difference between the airlines correspond mainly to differences in route and the route lengths in particular).

4.1.15 Hence the overall fall in revenue in freight is nearly all attributable to operations in mixed aircraft, until now the major component of air freight capacity. Differences in the commodities of cargo have now changed so that over 50% of passenger flights from Buenos Aires to Lima carry about 1,000 kgs of meat.

4.1.16 Developments

The future structure will depend on the operating costs and revenues of the airlines. In the past, the rates in the FALAC area have been determined against a background of almost negligible direct operating costs, as nearly all international freight has been carried on passenger aircraft.

4.1.17 A lower limit to the level of air freight rates is set by ground handling, sales and accounting costs.

4.1.18 At least until 1975, most international air freight carried by the FALAC airlines will be in passenger aircraft. Not only are the types of aircraft determined but even the Boeing 747 in passenger operation will offer the same passenger-freight capacity ratio. There will be no sudden changes in low cost freight capacity on passenger aircraft. Freight handling from these aircraft will not see a dramatic reduction in costs.

4.1.19 Over the period ahead, cargo aircraft will be introduced with a consequent rise in overall direct operating costs. Expected decreases in handling costs will not outweigh these increases in DOC and so result in decreased total operating costs.

4.1.20 Hence commodity rates of 6 c/tonne km (meat from Ezeiza to Callao Lima) are not realistic for all-freight operations, even with modern low-cost equipment.

4.1.21 This has been recognised by operators in all parts of the world and there is a general pressure from all operators, particularly the more developed air-freight carriers, to resist any lowering of rate and even to propose increases.

4.1.22 Against this background, it is reasonable to assume that for the FALAC airlines, rates will remain constant. Of course there will be developments in the rate structure, probably including a volume provision against the decreasing densities of cargo in this area. But on a weight basis there will probably be a freeze on rate decreases.

4.1.23 Revenues, however, will change slightly and we can assume that to 1975 the average revenue on passenger flights will be 15 c/tonne km and on all-cargo flights, 13.5 c/tonne km.

AIR CARGO RATES - JUNE 1968

North Within South America

FROM	TO	DISTANCE Km	RATE 45Kgs. c/Tonne-Km	RATE 500 Kgs c/Tonne-Km	LOWEST COMMODITY RATE c/Tonne-Km	NUMBER OF COMMODITY RATES
Buenos Aires	Bogota	4,681	19.2	7.7	6.4	3
	Caracas	5,130	20.2	10.2	5.9	4
	La Paz	2,252	32.0	13.8	-	-
	Lima	3,139	22.8	9.9	8.0	6
	Quito	4,378	20.5	7.8	6.8	1
La Paz	Bogota	2,439	18.8	8.1	-	-
	Quito	2,141	35.0	14.0	-	-
	Lima	1,082	49.0	24.9	14.8	1
Lima	Bogota	1,889	21.2	10.6	-	-
	Caracas	2,753	30.1	15.0	-	-
	Quito	1,330	30.1	15.0	-	-
Quito	Bogota	1,383	58.1	44.3	-	-
	Caracas	1,745	41.8	28.1	20.6	2
Santiago	Bogota	4,255	18.1	7.8	5.9	2
	Caracas	4,920	22.4	12.6	5.7	2
	La Paz	1,906	24.1	12.1	10.0	1
	Lima	2,465	21.5	11.0	6.5	7
	Quito	3,797	20.3	8.7	-	-
Lima	Guyaquil	1,136	35.2	17.6	-	-
Lima	Guyaquil	2,042	36.7	14.7	-	-

To United States and Panama from South America

Bogota	Panama	761	28.8	19.7	-	-
Buenos Aires		5,351	16.9	6.7	5.6	3
La Paz		3,099	19.3	8.3	-	-
Lima		2,370	16.9	8.5	9	1
Quito		1,030	38.8	19.4	10.7	1
Santiago		4,822	16.3	6.9	5.8	2
Guyaquil		1,252	31.9	16.0	-	-
Bogota	Miami	2,441	26.7	12.7	8.2	6
Buenos Aires		7,117	17.7	8.0	9	1
Caracas		2,197	27.8	22.3	4.1	2
La Paz		4.881	22.9	11.6	-	-
Lima		4,218	17.8	12.1	7.1	5
Santiago		6,669	18.3	8.3	4.5	6
Quito		2.889	26.0	17.7	6.9	3
Bogota	New York	3,996	20.0	11.5	6.3	8
Buenos Aires		8,534	15.3	7.3	4.1	7
Caracas		3,405	24.4	16.7	3.5	7
La Paz		6,380	19.5	9.4	9.4	1
Quito		4,558	19.3	11.6	7.2	3
Lima		5,874	15.0	9.0	4.6	4
Santiago		8,249	14.6	7.1	5.5	5

Table 4.1a.

AIR CARGO RATES - UNE 1968

South Within South America

FROM	TO	DISTANCE Km	RATE 45Kgs. c/Tonne-Km	RATE 500Kgs. c/Tonne-Km	LOWEST COMMODITY RATE c/Tonne-Km	NUMBER OF COMMODITY RATES
Bogota	Buenos Aires	4,681	38.2	27.5	16.0	2
	La Paz	2,439	46.3	32.4	28.4	1
	Lima	1,889	42.4	30.2	10.6	8
	Quito	1,883	58.1	44.3	18.0	2
	Santiago	4,255	36.0	25.1	7.0	2
Caracas	Buenos Aires	5,130	40.3	26.5	-	-
	Quito	1,745	51.6	36.1	-	-
	Lima	2,753	46.9	31.6	12.7	1
	Santiago	4,920	37.8	28.3	-	-
La Paz	Buenos Aires	2,252	47.1	34.2	-	-
	Santiago	1,906	47.8	36.2	-	-
Lima	Buenos Aires	3,139	45.5	33.5	15.9	2
	La Paz	1,082	50.8	37.9	31.4	3
	Santiago	2,465	43.0	32.0	17.8	1
Quito	Buenos Aires	4,378	40.9	29.5	-	-
	La Paz	2,141	52.8	36.9	16.3	1
	Lima	1,330	56.4	42.9	13.5	-
	Santiago	3,797	40.3	28.2	-	-
Guyaquil	Lima	1,136	54.6	40.5	19.4	1
	La Paz	2,042	51.8	38.7	29.8	1

United States and Panama to South America

Panama	Bogota	761	32.9	26.3	17.1	3
	Buenos Aires	5,351	33.5	24.1	16.8	2
	La Paz	3,099	36.5	25.5	21.3	4
	Lima	2,370	33.7	24.1	16.8	6
	Quito	1,030	40.8	31.0	28.1	4
	Santiago	4,822	31.8	22.2	17.4	1
	Guyaquil	1,252	34.4	25.6	17.5	4
Miami	Bogota	2,441	36.9	24.2	12.3	3
	Buenos Aires	7,117	34.3	24.6	16.2	4
	Caracas	2,197	34.4	22.3	8.2	2
	La Paz	4,881	36.3	24.0	18.7	3
	Lima	4,218	34.1	22.5	17.8	6
	Quito	2,889	36.7	24.6	19.0	3
	Santiago	6,669	32.4	21.9	19.8	3
New York	Bogota	3,996	25.5	22.5	-	-
	Buenos Aires	8,534	32.1	21.6	17.6	2
	Caracas	3,405	24.4	16.7	12.9	4
	La Paz	6,380	31.5	23.0	20.1	2
	Lima	5,874	34.6	21.3	18.7	3
	Quito	4,558	34.6	22.2	-	-
	Santiago	8,249	34.5	20.6	18.2	3

Table 4.1b

DEVELOPMENT OF THE AIR RATE STRUCTURE IN LATIN AMERICA

1963-1968

NORTH 1963	DISTANCE	R.45	R.500	NUMBER OF COMMODITY RATES	1968	R.45	R.500	NUMBER OF COMMODITY RATES
Buenos Aires/Quito	4,378	24.9	7.75	-		20.5	7.75	1
Buenos Aires/Caracas	5,130	20.3	10.15	1		20.2	10.15	4
Buenos Aires/Lima	3,139	22.9	9.85	2		22.8	9.85	6
Buenos Aires/Miami	7,117	17.7	8.0	1		17.7	8.0	1
Buenos Aires/New York	8,534	15.3	7.26	1		15.3	7.26	7
Santiago/Bogota	4,255	18.1	7.75	-		18.1	7.75	2
Santiago/Caracas	4,720	22.4	12.6	1		22.4	12.6	2
Santiago/Lima	2,465	21.5	10.95	2		21.5	10.95	7
Santiago/Quito	3,797	40.3	28.2	-		20.3	8.7	-
Santiago/Miami	6,669	16.8	8.25	2		18.3	8.25	2
Santiago/New York	8,249	15.1	7.3	2		15.0	7.26	5
SOUTH								
Caracas/Buenos Aires	5,130	40.3	26.5	-		40.3	26.5	-
Caracas/Santiago	4,920	37.8	28.2	-		37.8	28.3	-
Lima/Buenos Aires	3,139	45.6	33.5	-		45.5	33.5	2
Lima/Santiago	2,465	43.0	32.0	1		43.0	32.0	1
Miami/Santiago	6,669	32.4	21.9	1		32.4	21.9	3
Miami/Buenos Aires	7,117	34.3	23.6	-		34.3	23.6	4
New York/Buenos Aires	8,534	30.8	21.6	-		-	-	-
New York/Santiago	8,249	29.0	20.6	-		-	-	-
Quito/Buenos Aires	4,378	40.8	29.4	-		40.9	29.5	-
Bogota/Santiago	4,264	34.9	25.0	-		36.0	25.1	2
Quito/Santiago	3,797	40.3	28.2	-		40.3	28.2	-
London/New York	5,540	34.4	15.4	30		34.3	13.3	53
New York/London	5,540	34.4	15.4	21		34.3	13.3	64

R.45 = General Rate for 45 Kilos in cents/tonne km.

R.500 = General Rate for 500 Kilos in cents/tonne km.

Table 4.1c

Commodity Rates: U.S. Dollars per kg. 500 kg. minimum weight (unless otherwise indicated)

From / To	Buenos Aires	Mendoza	Santiago	Lima	Bogota	Quito	Caracas	Miami	New York	London	Panama	Mexico
Buenos Aires									F.O 37[3] FBO 40 M 0.40[3]	FV 0.70 FB 0.68 M 0.60[3] CF 0.80		
Santiago				FB 0.16 M 0.14[3]	FB 0.25		FV 0.34	FV 0.30 FB 0.35	FVO.52[3] FBO.52 CFO.52[x]	V 0.76 FB 0.71 CF 0.86[2]	FB 0.28	FV 0.61[4]
Lima	AP 0.50[3]								APO.40	FV 0.80 AP 0.70		
Bogota			M 0.30[3]	M 0.20[3]			V 0.20		FVO.30[2] MO .25[3] CFO.25	M 0.70		
Quito				M 0.18[3]			M 0.38[2]		CF 0.33[x]			
Caracas									FV 0.13[5] F 0.14[5]	FV 0.58 CF 0.98[1]		

Key

1 - Minimum weight - 45 kg
2 - Minimum weight - 300 kg
3 - Minimum weight - 1,000 kg
4 - Minimum weight - 1,500 kg
5 - Minimum weight - 2,000 kg

FV Fruit and Vegetables
V Vegetables
FB Fresh Fish
M Meat
CF Cut Flowers
AP Avacado Pears

X Cut flowers except orchids

Table 4.1d

AIR CARGO REVENUE COMPONENTS

US CENTS PER TONNE-KM PERFORMED ON SCHEDULED SERVICES

Source ICAO

Airline	1965		1967		An annual rate of growth
	Coverage	Revenue US ¢ per tonne-km	Coverage	Revenue US ¢ per Tonne-km	
SCHEDULED SERVICES					
Aerolineas Argentinas			F.Ep.D	12.1	
LAB	F.Ep.D	15.8	F.Ep.D	12.1	
Lan Chile	F.Ep.D	15.8	F.Ep.D	12.7	-10.4
Avianca	F.Ep.D	18.2	F.Ep.D	20.0	+ 4.8
Ecuatoriana	F.Ep.D	21.5	F.Ep.D	34.8	+27.2
APSA	F.Ep.D	17.2	F.Ep.D	14.9	- 6.9
VASA	F.Ep.D	27.2	F.Ep.D	32.7	+ 9.6
Aeroconder	F.Ep.D	10.6	F.Ep.D	15.3	+20.1
VARIG	F.Ep.D	18.5	F.Ep.D	17.5	- 2.75
Lufthansa	F.Ep.D	17.3	F.Ep.D	17.1	- 0.6
KLM	F.Ep.D	17.1	F.Ep.D	16.2	- 2.7
BOAC	F.Ep.D Ex	20.8	F.Ep.D	17.7	(- 7.8)*
BRANIFF (INT)	F.Ep.D	18.9	F.Ep.D	14.7	- 9.6
Pan Am (L.AMELICA)	F.Ep.D	15.8	F.Ep.D	15.7	- 0.3
CARGO AIRLINES					
Seaboard (INT)	F.Ep.D	10.3	F.Ep.D	10.2	- 0.5
Trans-Mediterranean	F.Ep.D	19.8	F.Ep.D	20.6	+ 2.0
ALL US AIRLINES, SCHEDULED ALL-CARGO SERVICES	F.Ep.D	1966 - 13.4	F.Ep.D	1967 - 13.0	- 3.0
EARB Airlines: freight on pax services	F.Ep.D	1961 - 29.4	F.Ep.D	1966 - 31.67	
EARB Airlines: freight on all-cargo services	F.Ep.D	1961 - 27.7	F.Ep.D	1966 - 28.69	

F - Freight

Ep - Express

D - Diplomatic Bags

Ex - Excess Baggage

* - not strictly comparable

Table 4.1a.

Future Trends in Air Freight Rates Estimated by ICAO

(Scheduled operations of airlines of ICAO States)

	Average Scheduled Service freight rate per tonne/km US c
1957	24.8
1958	24.3
1959	24.0
1960	22.9
1961	21.8
1962	20.5
1963	20.6
1964	19.7
1965	18.2
1966	18.0
1967	17.7
1968	(17.0)*

Forecasts	Low	Medium	High
1970	15.7	16.3	17.0
1975	12.8	14.7	17.0
1980	10.5	13.4	17.0
Annual Percentage Change	- 4%	- 2%	-

* Average rate 1968 estimated at 4% below 1967; volume at 20% above 1967.

Source ICAO 89-AT/15

AIR CARGO: WEIGHT DISCOUNTS ON GENERAL RATES:

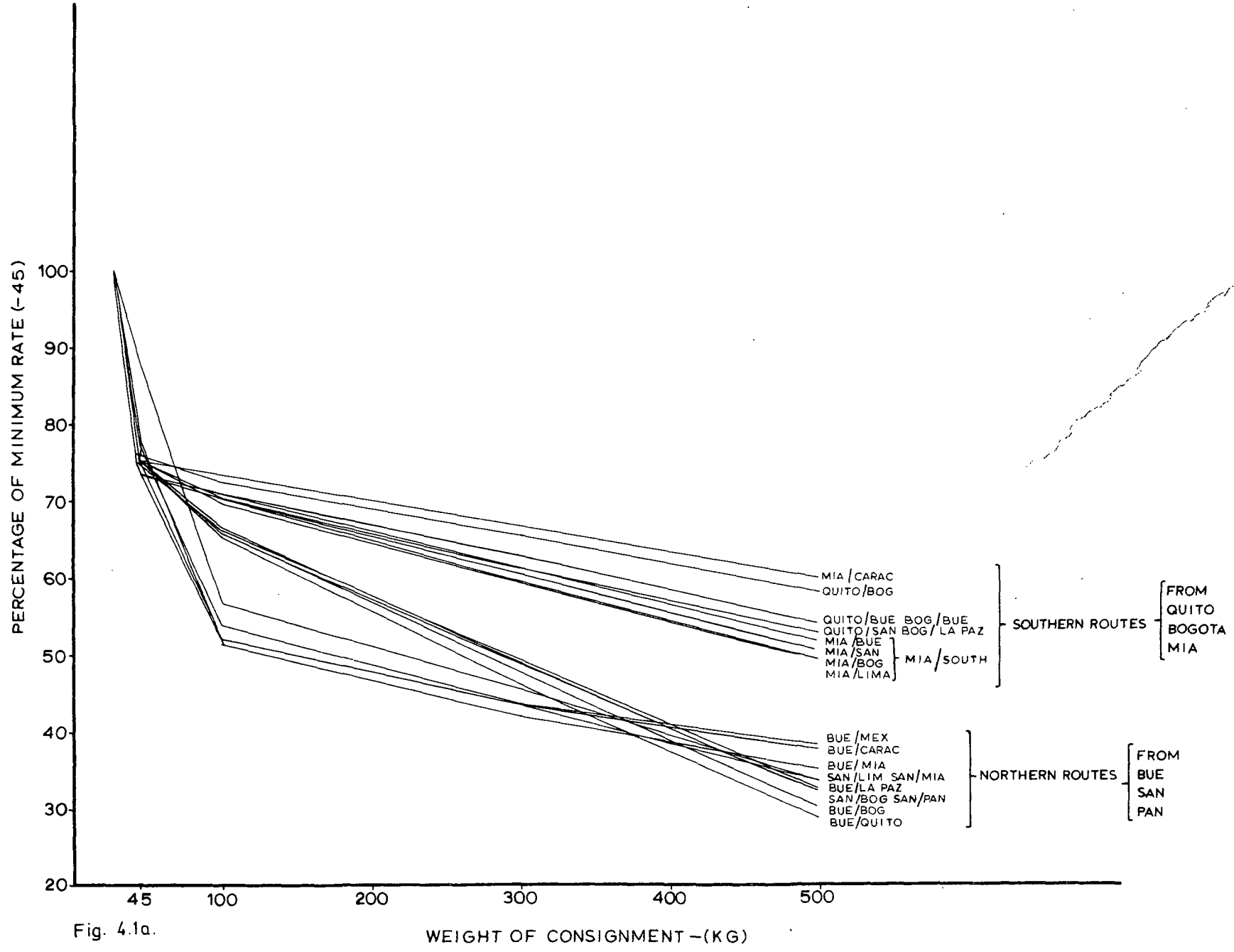


Fig. 4.1a.

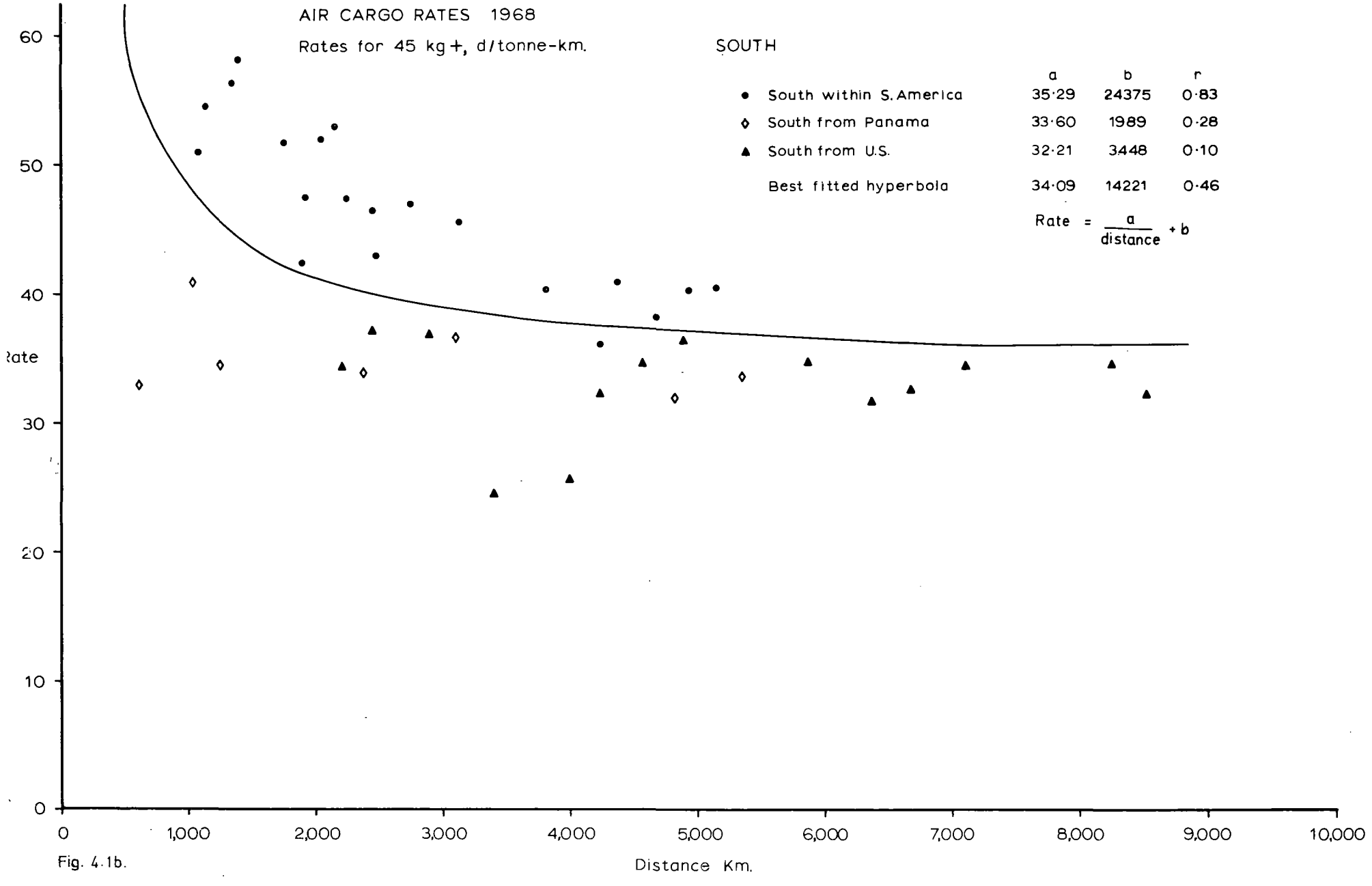

AIR CARGO RATES 1968
Rates for 45 kg +, d/tonne-km.
SOUTH
a b r
South within S. America 35·29 24375 0·83
South from Panama 33·60 1989 0·28
South from U.S. 32·21 3448 0·10
Best fitted hyperbola 34·09 14221 0·46
Rate = a/distance + b
Rate
60
50
40
30
20
10
0
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
Distance Km.

Fig. 4.1b.

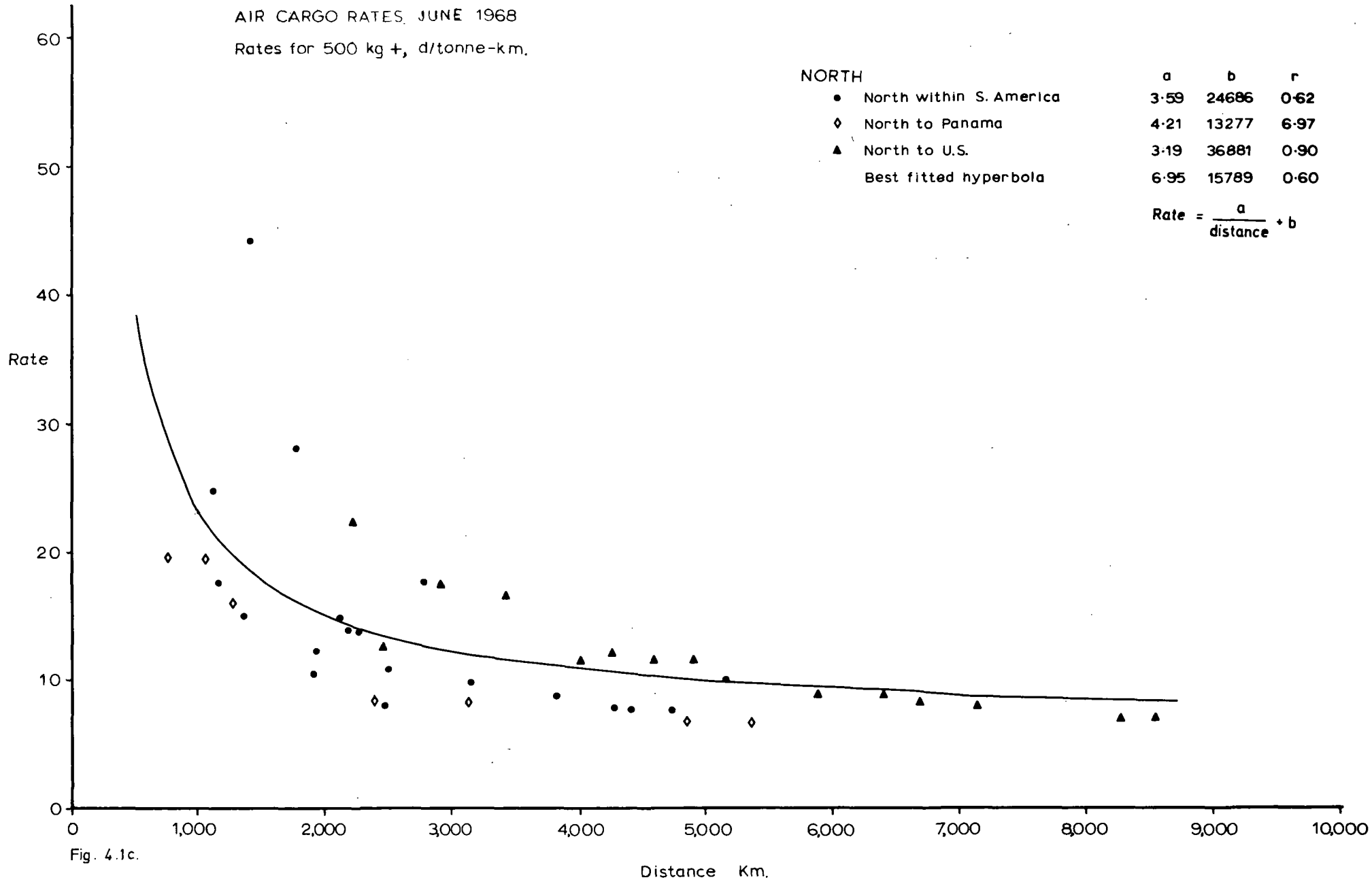

AIR CARGO RATES JUNE 1968
Rates for 500 kg +, d/tonne-km.
NORTH
a b r
North within S. America 3·59 24686 0·62
North to Panama 4·21 13277 6·97
North to U.S. 3·19 36881 0·90
Best fitted hyperbola 6·95 15789 0·60
Rate = a/distance + b
Rate
0
10
20
30
40
50
60
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
Distance Km.

Fig. 4.1c.

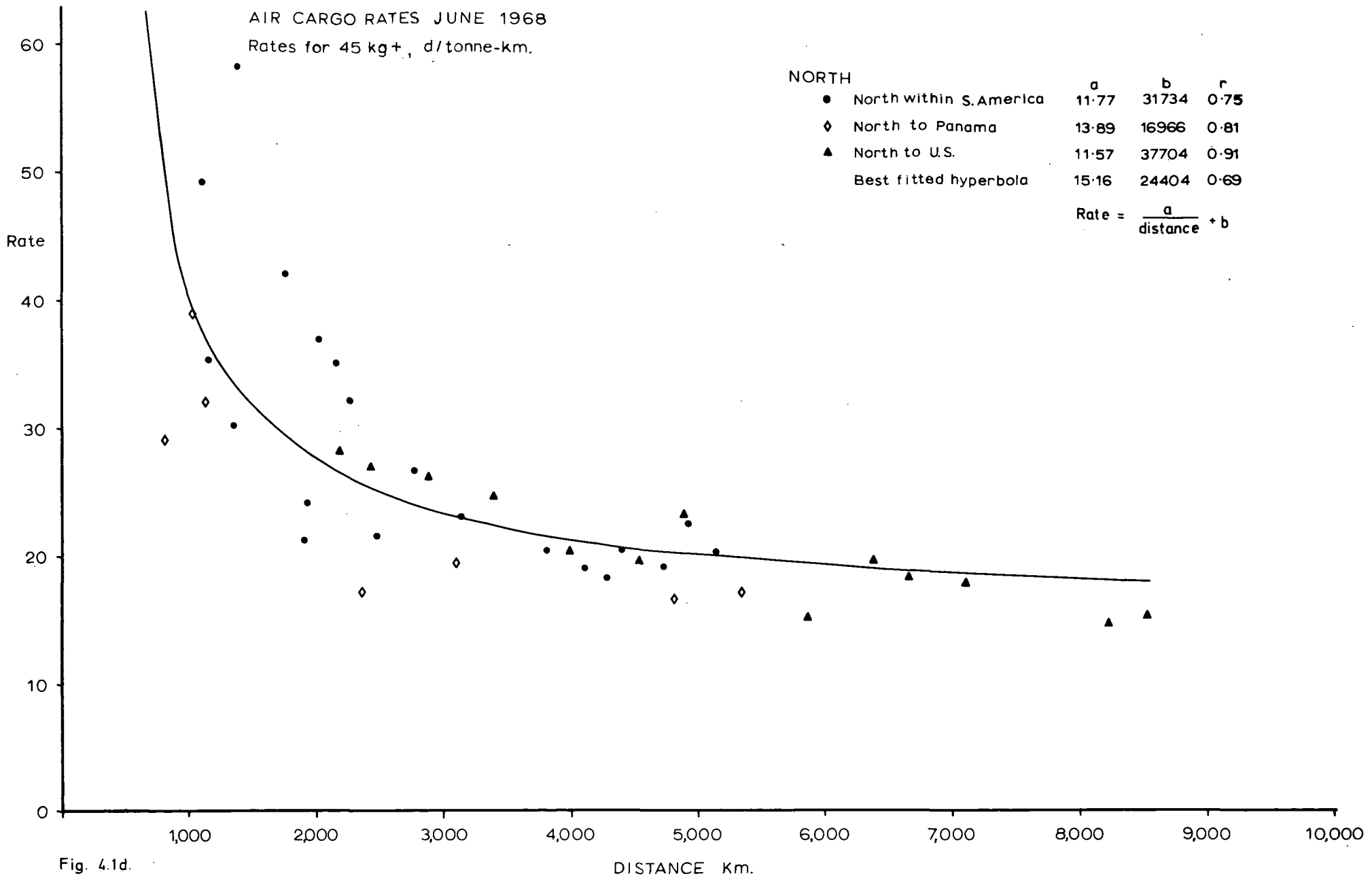

AIR CARGO RATES JUNE 1968
Rates for 45 kg+, d/tonne-km.
NORTH
a b r
North within S. America 11·77 31734 0·75
North to Panama 13·89 16966 0·81
North to U.S. 11·57 37704 0·91
Best fitted hyperbola 15·16 24404 0·69
Rate = a/distance + b
Rate
60
50
40
30
20
10
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
DISTANCE Km.

Fig. 4.1d.

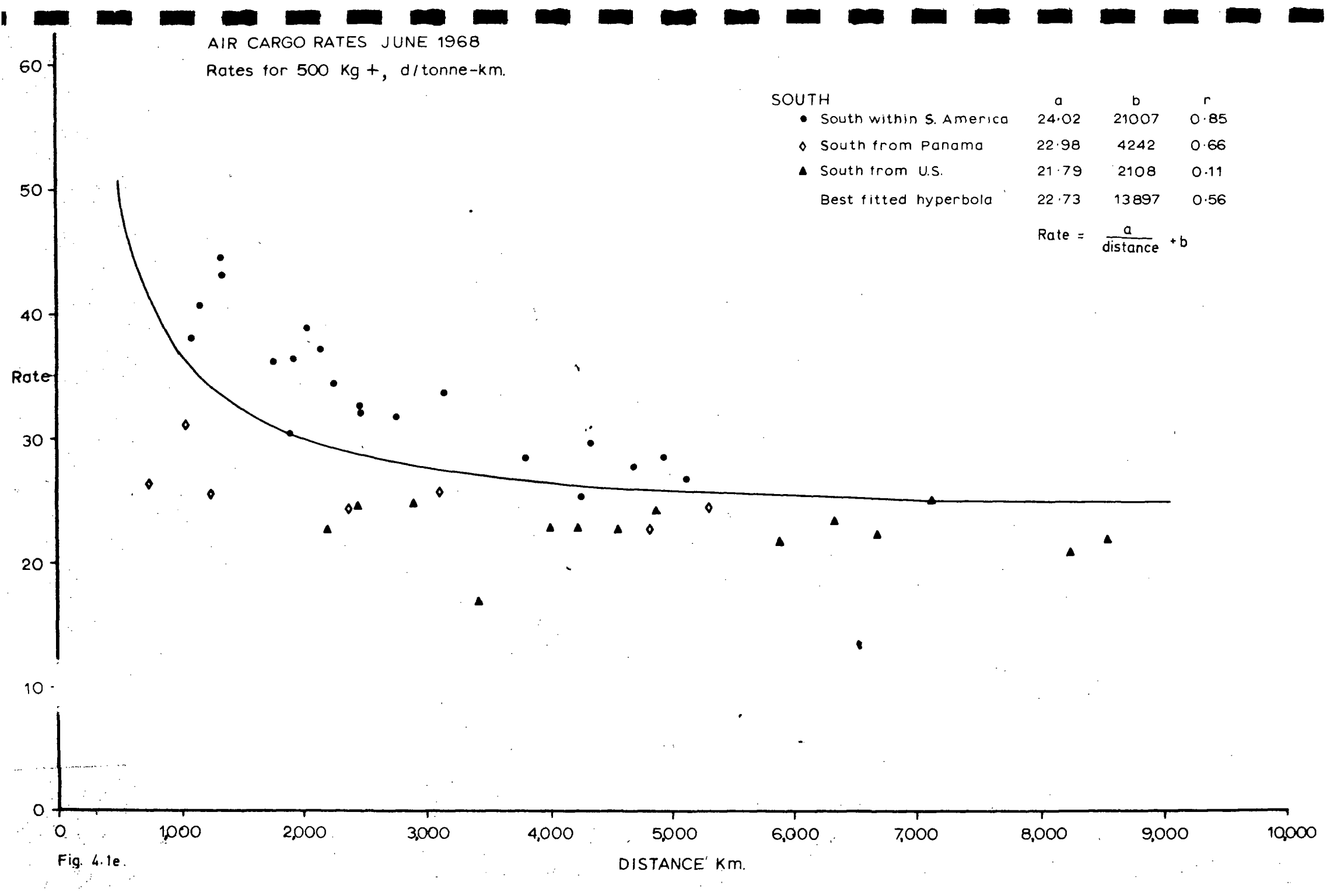

AIR CARGO RATES JUNE 1968
Rates for 500 Kg +, d/tonne-km.
SOUTH
a
b
r
South within S. America
24·02
21007
0·85
South from Panama
22·98
4242
0·66
South from U.S.
21·79
2108
0·11
Best fitted hyperbola
22·73
13897
0·56
Rate = a/distance + b
Rate
60
50
40
30
20
10
0
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
10,000
DISTANCE Km.

Fig. 4.1e.

4.2 Costs

4.2.1 Total operating expenses will be examined in terms of the two components Direct Operating Costs and Indirect Operating Costs.

4.2.2 Direct Operating Costs

The costs structure of each airline has as its basis the operating costs of the aircraft themselves. These direct operating costs include fuel, crew, salaries, maintenance and depreciation of the aircraft, and are commonly aggregated into a single Direct Operating Cost.

4.2.3 This item is the sum of the first three entries under Operating Expenses- Flight Operations, Maintenance and Overhaul, Depreciation and Amortization - in the cost summary, Table 4.2a and is separated in Table 4.2b.

4.2.4 This cost figure depends on the type of operation, sector length, type of equipment, utilisation as well as fuel and crew costs and in view of the wide differences between the FALAC airlines these costs must be expected to be entirely different.

4.2.5 Apsa alone, of the FALAC airlines, operates entirely on international routes and the fact that of all the FALAC airlines its reported Direct Operating Cost of 7.9 cents (U.S.) tonne-Kilometres (1967), is the only one less than ICAO reported average International Services figure of 8.9 cents, correlates with the longer sector lengths and predominance of the larger, more productive equipment operated. The other airlines have their total costs weighted by the inevitable higher costs of domestic services operated on shorter stage lengths with less productive equipment including piston engined aircraft.

4.2.6 Even on international operations, the FALAC airlines, on the whole operate shorter stage lengths (see Table 4.2c) than American airlines' operations on international routes thus incurring somewhat higher operating costs (see Figure 4.2a)

4.2.7 On the international routes, all the FALAC operations with the exception of Lloyd and Ecuatoriana operate modern all-jet aircraft on passenger services, these last two operating Lockheed Electra Aircraft. All-cargo operations are by piston-engined aircraft.

4.2.8 The average Direct Operating Costs for various aircraft, achieved by United States domestic airline operations, are shown in Table 4.2d.

4.2.9 The mixed passenger-cargo types are typical of the aircraft operated by the FALAC carriers, for the predominant part of all international services, passenger and cargo.

4.2.10 It can immediately be seen that whereas there is a wide range in the reported costs of operating the mixed aircraft types currently operated in the FALAC airlines - 5.13 c/tka for the Boeing 707 - 300 B, against 10.77 c/tka for the Convair - 990, this difference relates not only to basic productivity differences but also utilisation. In fact Apsa the operator of CV.990 aircraft achieves a very high utilisation rate, exceeding 11 hours, and report 7.9 c/tka D.O.C. for their 1967 operations which included some piston operations.

4.2.11 Cargo Aircraft Costs

The cargo aircraft costs underline

1. The improvement in economics of cargo aircraft to mixed aircraft - 3.08 c/tka to 5.13 c/tka - reported for the B - 707 - 300C and
2. The wide difference in costs between the modern jet freighter and the piston engined aircraft now operated on international routes by the FALAC carriers (see Figure 4.2b.)

4.2.12 Average Reported D.O.C. (c/tka) of Cargo Aircraft

Modern 4 engined jet 3.19
C.46 12.16

4.2.13 For all cargo aircraft however, very much lower utilisation rates are reported than for mixed aircraft, see Table 4.2d, and these figures are consistent with the all-cargo operations of the FALAC carriers. Some of this difference relates to loading times etc. It is indicated elsewhere in this report, that for the small scale of operations in cargo relevant to the FALAC carriers, improvements in handling and loading cannot be expected to be dramatic. Realistic Utilisation rates for 4-engined jets in FALAC operation cannot be expected to exceed 7 or 7.5 hours daily.

4.2.14 Load Factor

The direct operating costs in terms of performed tonne-kilometres are a direct function of Load Factor. Reasonable load factors for cargo aircraft in this area must allow for directional imbalance of traffic.

4.2.15 For the utilisation rates of 7 to 7.5 hours/day, in this region average load factors of 60% are practical maxima for a FALAC all-cargo operation. Increasing load factors will lower the utilisation or vise-versa.

4.2.16 Developments

In general, we would expect that as re-equipment proceeds (for some of the FALAC airlines) and utilisation increases, the average figure of D.O.C. on international routes on mixed aircraft will approach 10 c/tka.

4.2.17 For the seven FALAC airlines the average Direct Operating Cost in 1967 was 10.43 cents (U.S.) per tonne kilometre available. However although in terms of the reported (TCAO) airlines, this average has fallen since 1965 (from 12.6 cents) this fall is due almost entirely to a spectacular fall in costs in Ecuatoriana. Two of the major airlines, Viasa and Avianca,show increases.

4.2.18 Viasa's increase in maintenance and depreciation on new equipment and Avianca's increase in Flight operations costs as well as depreciation have been responsible.

4.2.19 Long Run Differences in Direct Costs of FALAC airlines

However equipment is rationalised, there will still be large differences in Direct Costs between the FALAC airlines, source of these differences will relate to routes. Hence fuel, which averages about 13% of Direct Costs, has reported prices for one airline - ranging from 10 cents / U.S. gall at Miami to 32 cents / U.S. gallon at Quito.

4.2.20 Again flight crew salaries vary by factors up to 3 between individual FALAC airlines, and although some movements towards rationalisation will take place the major position of these differences will remain.

Revenues and Costs of FALAC Airlines

	ARGENTINA Aerolineas Argentinas		BOLIVIA Lloyd Aereo Boliviana		CHILE LAN		COLOMBIA Avianca		ECUADOR Ecuatoriana		PERU APSA		VENEZUELA VIASA	
	1965	1967	1965	1967	1965	1967	1965	1967	1965	1967	1965	1967	1965	1967
Operating Revenues					**Per Tonne-Kilometre Performed (US Cents)**									
a) Scheduled Services														
Passenger	27.9	-	-	24.1	23.4	31.1	33.0	62.7	32.8	-	33.7	47.5	44.5	
Cargo	14.3	-	-	15.8	13.5	13.2	20.9	40.4	33.9	-	19.6	27.2	36.5	
Mail	55.8	-	-	107.0	153.5	-	1.5	107.7	76.9	-	63.8	66.1	66.2	
Total Schedule	27.1	-	-	23.1	22.3	29.4	32.6	58.9	33.5	-	32.6	45.5	43.2	
b) Total Non-Schedule	821.7	-	-	*	*	9.5	10.2	53.5	40.8	-	-	0.1	22.3	
Operating Expenses														
Flight Operations	10.0	-	-	12.5	9.8	6.1	7.0	23.8	10.8	-	7.0	14.8	17.5	
Maintenance and Overhaul	5.6	-	-	6.3	5.8	5.2	4.9	14.8	4.9	-	3.9	3.1	6.9	
Depreciation Amortration	4.8	-	-	1.8	1.6	2.1	2.5	5.8	1.9	-	3.3	3.0	5.0	
Ground Expenses	2.9	-	-	2.5	2.4	5.3	5.5	8.0	4.5	-	3.7	0.8	3.0	
General Administration including Passenger services and Ticketing	15.0	-	-	8.4	8.5	11.2	12.2	22.7	16.2	-	15.3	9.6	18.8	
Total	38.3	-	-	31.5	28.5	29.9	32.1	75.1	28.3	-	33.2	31.2	51.2	
					Per Tonne-Kilometre Available (US Cents)									
Operating Revenues														
Scheduled Services	14.5	-	-	16.2	15.0	18.0	20.5	18.3	19.0	-	18.3	25.0	21.3	
Non-Scheduled Services	651.7	-	-	*	*	7.6	8.2	42.8	30.6	-	-	0.1	17.8	
Total Operations	15.3	-	-	18.0	15.5	18.6	20.9	22.4	23.1	-	18.8	21.1	26.1	
Operating Expenses														
Flight Operations	5.4	-	-	8.7	6.7	3.7	4.4	7.9	6.1	-	3.9	9.2	9.6	
Maintenance and Overhaul	3.0	-	-	4.4	3.9	3.3	3.1	4.9	2.8	-	2.2	1.9	3.4	
Depreciation and Amortization	2.6	-	-	1.3	1.0	1.3	1.6	1.9	1.1	-	1.8	1.9	2.5	
Ground Expenses	1.5	-	-	1.8	1.6	3.3	3.5	2.7	2.6	-	2.1	0.5	1.5	
General Administration including Passenger Services and Ticketing	8.0	-	-	5.9	5.8	6.9	7.8	7.4	9.2	-	8.6	5.9	9.3	
Total	20.5	-	-	22.1	19.0	18.5	20.4	24.8	21.8	-	18.6	19.4	25.3	
					Percentage Distribution of Operating Expenses									
Operating Revenues														
a) Scheduled Services														
Passenger	82.	-	-	68.9	73.6	69.0	69.9	64.9	72.2	88.1	88.3	67.7	64.8	
Total Cargo	6.2	-	-	14.0	13.9	17.3	16.5	11.3	8.1	3.2	6.2	8.0	13.3	
Mail	6.4	-	-	4.6	6.2	7.5	8.2	1.0	2.3	3.0	2.6	3.5	2.8	
Total Scheduled Services	94.7	-	-	87.5	93.7	93.8	94.6	78.0	82.68	94.3	97.1	81.2	80.9	
b) Non-Scheduled Services	1.0	-	-	*	*	0.6	1.4	7.9	0.1	-	-	0.1	0.7	
c) Incidental Revenues	4.3	-	-	10.3	6.3	3.9	4.0	14.1	17.5	3.9	2.9	16.0	18.4	
Total	100.0	-	-	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Operating Expenses														
Flight Operations	26.1	-	-	39.5	34.9	20.3	21.9	31.7	28.2	23.5	21.2	47.4	34.2	
Maintenance and Overhaul	14.7	-	-	20.1	20.7	17.6	15.1	19.8	12.9	12.7	11.9	9.9	13.5	
Depreciation and Amortization	12.5	-	-	5.6	5.6	7.0	77.8	7.7	5.0	10.0	9.8	9.5	9.8	
General Administration	7.4	-	-	8.1	8.5	17.8	17.2	10.7	11.8	10.0	11.1	2.5	5.8	
Passenger Services and Ticketing	39.3	-	-	26.7	30.3	37.3	38.0	30.1	41.1	43.8	46.1	30.7	37.7	
Total	100.0	-	-	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

* Not Reported

Source: ICAO Traffic Statistics 1967.

Table 4.2a

Direct Operating Costs of FALAC Airlines

Airline	DOC/Tonne Km Available		DOC/Tonne Km Performed	
	1965	1967	1965	1967
Aerolineas Argentinas	-	11.0	-	20.4
Aerolineas Peruanas	-	7.9	-	14.2
LAB	-	-	-	-
LAN Chile	14.4	11.6	20.6	17.2
Avianca	8.3	10.1	13.4	14.4
Ecuatoriana	14.7	10.0	44.4	17.6
VIASA	13.0	14.5	20.9	29.4
Average	12.6	10.43	24.83	18.2

Table 4.2.b

Table 4.2.b

Average Length of Stage (Km)

Airline / Region	International Operations Scheduled and Non-Scheduled Flights Average Stage Length Km.
Latin America	
Aerolineas Argentinas	1,101
LAN Chile	1,399
LAV Venezuela	723
Europe	
Air France	1,196
KLM	1,079
BOAC	2,264
BEA	622
North America	
PAA (US)	1,674
Panagra (US)	1,441
Air Canada	1,011
Canadian Pacific	3,330
North West	2,305
TWA	2,591

Average of Airlines Registered in Region	International Operations Scheduled and Non-Scheduled Flights Average Stage Length (Km)
Latin America	1,041
Europe	1,069
North America	2,059

Sources: Fleet and Personnel Digest of Statistics No. 116 Series FP No. 18 (and Addendum)

Table 4.2.c

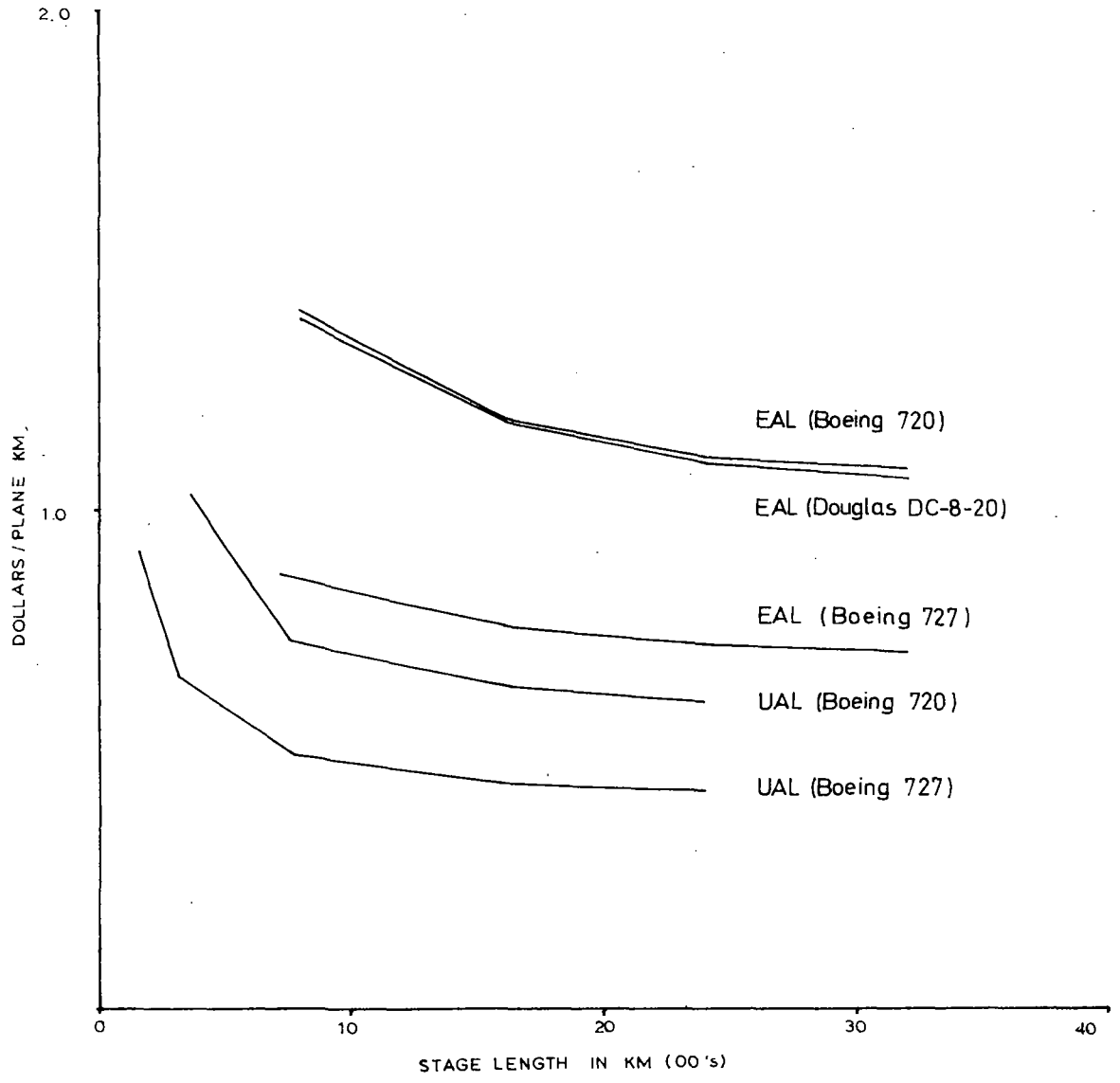
Direct Operating Costs and other Performance Characteristics

- Aircraft in United States Domestic Airline Service - 1964

Class of certified route air carriers	Direct Unit Cost	Utilisation (block time)
Aircraft type	¢/tka	h/day
B-727	8.07	6.9
B-707-100	7.14	10.1
B-707-100B	5.84	10.3
B-707-200/300	6.96	8.8
B-707-300B/C	5.13	11.3
B-720	7.16	9.9
B-720B	6.99	10.6
DC-8-10	8.05	10.5
DC-8-20/30	6.99	11.5
DC-8-50	6.53	10.7
CV-880	10.29	8.8
CV-990	10.77	7.8
Total 4-engine jet	7.26	10.0
Cargo aircraft		
C-46	12.16	5.6
DC-7B	12.59	4.9
L-1049C	6.61	5.3
L-1649	10.74	4.0
Total 4-engine piston	10.62	4.7
B-707-300C	3.08	6.5
DC-8F	3.29	6.8
Total 4-engine jet	3.14	6.6

Source: Direct Operating Costs and Other Performance Characteristics of Transport Aircraft in Airline Service - United States Federal Aviation Agency.

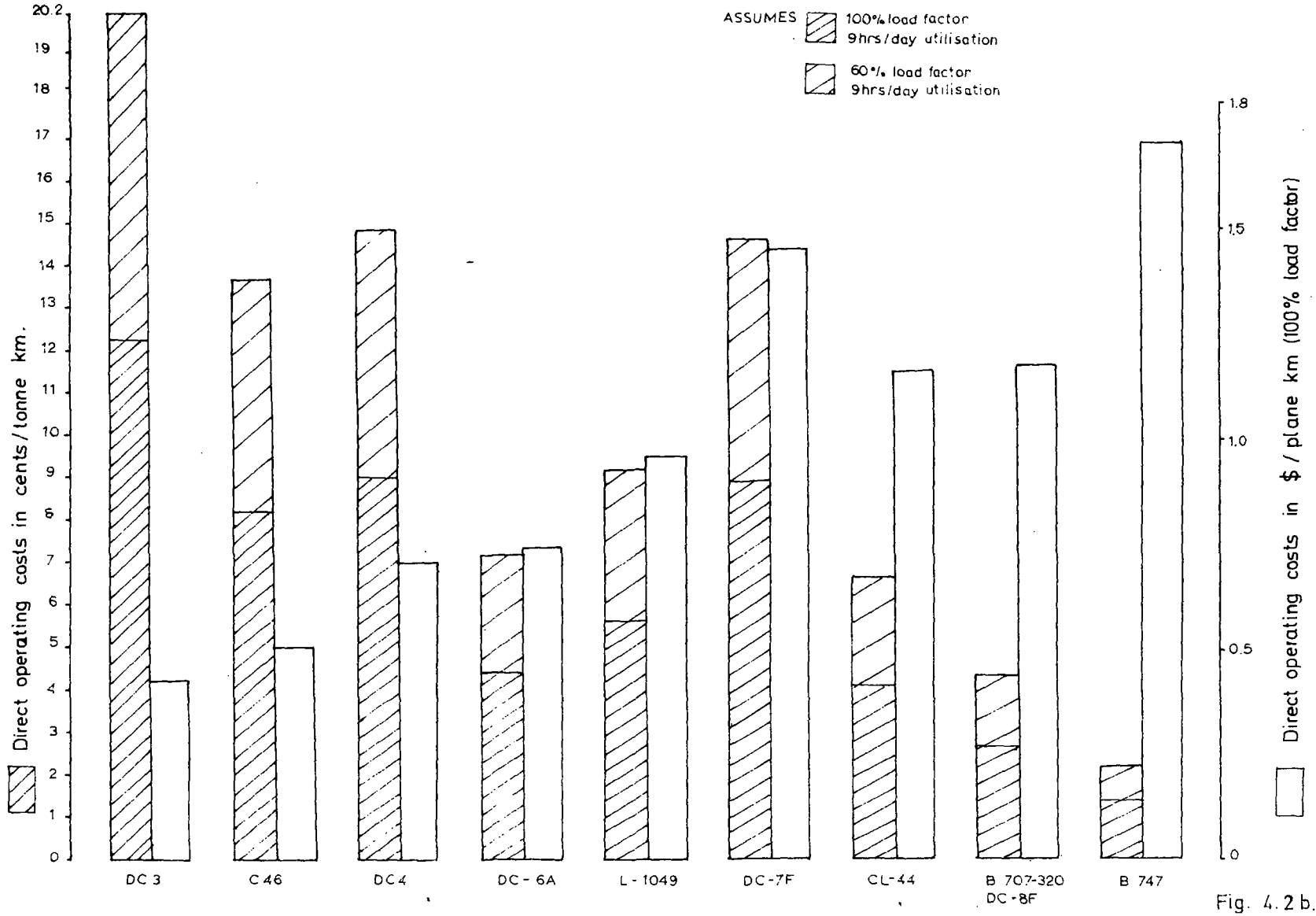
DIRECT OPERATING COST AND STAGE LENGTH



SOURCE : 'AIR CARGO COSTS' S.H. BREWER

Fig. 4.2a.

DIRECT OPERATING COSTS OF TYPICAL CARGO AIRCRAFT



SOURCE: 'AIR CARGO COMES OF AGE' BREWER

Fig. 4.2 b.

4.3 Indirect Operating Costs

4.3.1 Great difficulty was experienced in extracting meaningful indirect costs for cargo operations, and in particular, international cargo operations, of the FALAC carriers. In general, there appears to be no formal allocations of costs between cargo and passenger operations. Costs are, again in general, reported on an aircraft or station basis.

4.3.2 The indirect operating costs include ground expenses, administration, passenger services etc. and are shown in Table 4.3a. These figures represent the sum of all operations - passenger and cargo. The average for the FALAC airlines has increased from 8.6 c/tka to 10.3 c/tks between 1965 and 1967. This contrasts with the falling direct operating costs.

4.3.3 In general the sum of indirect costs are at least comparable to those of airlines in other regions. Hence even in 1963 indirect operating costs of 17.1 cents/tonne kilometres performed for Latin American registered airlines, compared to 14.1 cents for United States registered airlines. The lower costs of personnel salaries and wages were more than matched by the undeniably higher efficiency of the United States carriers. This fact is borne out by Tables 4.3d and 4.3e. Most of the staff expenses will fall in the indirect category and in general the FALAC airlines carry more staff than other world airlines.

4.3.4 This 1967 figure of indirect cost of 10.3 cents/tka indicates an indirect operating cost/direct operating cost ratio of 98.7%. This compares with a figure of 91% for the largest United States airlines.

4.3.5 But, of course, these costs describe the predominantly passenger operations of the FALAC airlines.

Cargo operations will incur distinct indirect costs. The factors contributing to these are described below

Indirect Cost Items for Cargo Operations	Factors in Systems and equipment	Factors in Traffic Characteristics
Terminal handling costs	a) cost & scale of terminal facilities	a) size of consignment
	b) utilisation of terminal facilities	b) unitization of consignment (number of packages per consignment)
	c) Productivity of staff employment	
Aircraft loading costs	a) Pallet loading	a) size of consignment
	b) aircraft dock or apron vehicles	b) unitization of consignment.
	c) packages on passenger aircraft	
Documentation and accounting costs		

4.3.6 In addition to these items,

Terminal Handling Costs

Aircraft Loading Costs

Documentation and Accounting Costs

directly attributable to cargo operations, although traditionally falling in the indirect category, proportions of sales and promotion, general and administrative and other operating expenses are certainly variable to the scale of cargo operations and should therefore be allocated to indirect costs of cargo.

4.3.7 As stated above, there is very little data within the FALAC airlines on indirect cargo costs; in general the total ground costs, passenger and cargo are not separated.

The best reported data on handling costs come from other predominantly United Kingdom and United States sources.

1. Reported figures for United Kingdom airlines for 1966/67 are (present, 1969, exchange rates) excluding sales and administration.

	Handling Cost $ (US)/ton
BEA Total System	65.5
BEA at Heathrow (excluding accounting)	35.2
BOAC at Heathrow (excluding loading)	37.0

2. Pan-American have described the details of their cargo handling costs incurred in Miami. The average consignment is 400 lbs consisting of 8 packages of 50 lbs each. The costs are as follows:

	Cost $ (US)/ton
Warehousing at 58.6 cents/package	23.44
Accounting and freight agents at 2.78$/consignment	13.90
Freight/loading	5.34
TOTAL	42.68

3. Canadair report a cost of $18/ton. This describes the cost incurred on daily movement averaging 400,000 lbs.

4 Professor Brewer reports that "the cost of handling freight through the most efficient air terminals is between $44 and $67/tonne."

All air cargo will be handled twice, at the origin and the destination. The Pan-American report on their Miami operations shows distinct costs for handling imported and exported freight.

4.3.8 These reported costs describe the operating experience of airlines extremely well developed in air freight. Although these costs are labour intensive and although labour costs are certainly much lower in the FALAC countries, the indirect costs of freight operations for the FALAC carriers can not be greatly different.

4.3.9 These costs do not include selling costs or costs of administration and it has been estimated that these items might together equal the terminal costs above. BOAC indicate that cargo loading staff, commission, direct selling costs and overheads are together 69% of their total ground and indirect expenses for freight operations. Even for small freight operations, the assumption that these activities can be entirely attributable to the passenger operations is not realistic in any long term sense. For a typical FALAC airline, an average total station staff of 44 includes only 2 cargo personel. There is no doubt that indirect cargo costs involve a higher proportion of ground costs than those indicated by this proportion of named 'cargo staff'.

4.3.10 These 'indirect' items of cargo cost will vary by length of haul and size of shipment.

4.3.11 Length of haul

Length of haul will be a major factor in determining how these ground incurred costs will contribute to the indirect costs on a tonne-kilometre basis. Figure 4.3b indicates the indirect operating costs (ignoring sales and administration) for the Pan-American figure of handling costs ($42.8/ton) - curve A, and the Canadair figure of $18.0/ton - curve B, for a range of haul distances. The indirect cost of a haul is assumed to equal twice the figure above, handling at both ends.

This indicates that even assuming that handling is equivalent to the best practice elsewhere, and with loads comparable to those described in the Pan-American exercise, the indirect operating costs of handling freight 2,000 kilometres is 4.25 c/tonne km. including warehousing, accounting and loading alone. Total indirect cost, including sales and administration, would probably be at least 9 c/tonne-km. The lengths of haul for FALAC operations, Table 4.3b shows that on many routes indirect cargo costs probably exceed this figure of 9 cents/tonne kilometre.

4.3.12 Size of Shipments

The costs are extremely sensitive to the size of shipment. Pan-American report terminal costs of 18 cents/kilogram for packages of size 10 kilograms, falling to 3.6 cents/kilogram for packages of size 100 kilograms (See figure 4.3a). The cargo shipment in the FALAC airliners have rather different distributions of size by weight, Table 4.3c. Ecuatoriana carries a large number of small categories. Aerolineas Argentinas, however, carry a great deal of high weight shipments.

4.3.13 The situation of the FALAC airlines

The revenue from cargo traffic has been growing for all the FALAC airlines both in absolute terms, and in proportion to total revenue, and is now a substantial part of the earnings of all the airlines (see Table 4.3f).

4.3.14 Almost all of this cargo traffic has been carried in passenger aircraft incurring negligible direct costs. However, indirect costs, although in general not defined by most of the FALAC airlines, have probably averaged 10 cents/tonne-kilometre. Hence with revenue rates averaging 15 cents/tonne-kilometre the contribution of belly-hold cargo operations has averaged about 30% of revenue.

4.3.15 Figure 4.3c shows how the general rate structures, with variations for shipment size and distance, follow the variations in indirect costs. However, the indirect operating cost curves in figure 4.3c only include the handling cost components. General and administrative cost allocations will be at least as much again in total but are difficult to allocate to shipment size. It is probable, however, that certain 'commodity' rates might involve net losses even when no direct costs are incurred.

4.3.16 On the small proportion of cargo carried in all-cargo aircraft, the equipment operated has been the obsolescent DC-4's and DC-6's. For these aircraft, even with high utilisation rates and load factors, minimum direct operating costs are about 12 cents/tonne-kilometre. For the FALAC airlines, operation of these aircraft will certainly have been at higher direct costs. These operations will have produced net losses to the FALAC airlines.

4.3.17 Developments

a) Direct Costs

In general, it can be expected that as re-equipment proceeds (for some of the FALAC airlines) and utilisation increases, the average figure of direct operating costs on mixed aircraft will fall. Re-equipment with all-cargo aircraft however will cause the average direct operating cost of cargo operations to RISE. For the average FALAC airline, less than 10% of international cargo has incurred direct costs. Certainly these costs have been high but as higher proportions of cargo incur direct costs even 50% lower, the AVERAGE direct cost will rise.

4.3.18 b) Developments in Handling

Using conventional methods, loading and unloading large capacity aircraft increases the ground time relative to that of smaller aircraft. The conventional methods involving hand stacking and the usual fork lift equipment show very little in the way of economies of scale. Up to the stage at which pallets and containers are extensively used, the indirect costs are almost entirely variable with the traffic handled. We can expect no reduction in unit costs for ground handling freight on passenger aircraft and very little for small scale all-cargo operations. Reductions to the figure quoted by Canadair, $18/ton, can only be expected from a very large scale bulk shipper

4.3.19 Other indirect cargo costs can not be expected to fall.

4.3.20 Indirect/direct operating costs for cargo aircraft

In Section 9 of this report, estimates are made of total operating costs of the FALAC airlines presuming, overall, the indirect operating costs for cargo aircraft operations are smaller than for passenger operations since tickets and passenger handling, etc. are large expense items.

The ratios of total operating cost, direct operating cost and indirect operating cost have remained steady since 1960. The reported ratios of these cost categories for American all-cargo airlines have been:-

	DOC/TOC	IOC/DOC
	0.	
1960	0.74	0.36
1961	0.75	0.33
1962	0.75	0.33
1963	0.72	0.39
1964	0.68	0.44
1965	0.71	0.42
1966 1	0.72	0.38

These compare with the IOC/DOC figure, for predominantly passenger operations of the top 4 United States airlines, of 0.91 for 1966, and a 1967 average of 0.98 for the FALAC airlines.

This 1966 ratio of 0.38 would be justifiable in estimating the total operating costs of a distinct all-cargo operation in Latin America.

4.3.21 Total Operating Costs - all types

On a world scale, total operating costs, the sum of direct and indirect costs, have been falling continually over the recent past.

Average Operating costs/tka (US. cents)

Airlines of ICAO Contracting States

Year	
1961	24.4
1962	20.2
1963	19.3
1964	18.3
1965	17.5
1966	17.2
1967	16.0

The forecast of continued fall to 13.6 c/tka in 1975 is now being countered by rising costs, particularly in the indirect category, and falling load factors indicate that on a performed basis this forecast of falling total operating costs is likely to be proved in error.

Indirect Operating Costs of FALAC Airlines

Airline	IOC/Tonne Km Available		IOC/Tonne Km Performed	
	1965	1967	1965	1967
Aerolineas Argentinas	-	9.5	-	17.9
Aerolineas Peruanas	-	10.7	-	19.0
LAB	-	-	-	-
LAN Chile	7.7	7.4	10.9	10.9
Avianca	10.2	11.3	16.5	17.7
Ecuatoriana	10.1	11.8	30.7	20.7
APSA	-	10.7	-	19.0
VIASA	6.4	10.3	10.4	21.8
Average	8.6	10.3	17.13	18.1

Table 4.3.a

Table 4.3.a

Air Mileage Inter-Plains Countries

To / From	Caracas	Bogota	Guayaquil	Lima	La Paz	Santiago	Buenos Aires	Average Mileage
Caracas	-	1,027	2,013	2,753	-	4,920	5,130	-
Bogota	1,027	-	995	1,889	-	4,264	4,688	2,572
Guayaquil	2,013	995	-	1,136	2,042	3,611	4,248	2,341
Lima	2,753	1,889	1,136	-	1,082	2,476	3,153	2,081
La Paz	-	-	2,042	1,082	-	1,906	2,252	1,821
Santiago	4,920	4,264	3,611	2,476	1,906	-	1,129	3,051
Buenos Aires	5,130	4,688	4,248	3,153	2,252	1,129	-	3,433
	Total Average Air Mileage							2,548

Source: Air Mileage Handbook

Table 4.3.b

Percentage Distribution of Number of Air Shipments by Weight Category - 'FALAC' Airlines 1968.

Airline	Months and Routes included in the Sample	0 - 4.9 kg	5.0 - 49.9 kg	50.0 - 99.9 kg	100.0 - 199.9 kg	200.0 - 499.9 kg	500.0 - 999.9 kg	1,000.0 and over kg
Aerolineas Argentinas	International Air Cargo ex Buenos Aires, March and September 1968 (767 Wayhills)	34%	39%	8%	4.5%	4%	2%	8.5%
Avianca	International Air Cargo March and September 1968 547 Waybills	34%	52%	5%	4.8%	3%	1%	0.2%
Ecuatotiana		35.8%	52.45%	5.8%	5.2%	0.75%	0.0%	0.0%
Viasa	Weights ex Guaria September 1968	15%	42%	14%	11.7%	9.6%	3.8%	3.8%
Earb Airlines	All Intra-European Freight Traffic 1952	36%	46%	9%	5%	3%	1%	-
Earb Airlines	16% of all Intra-European Freight Traffic (tu Kimi)	28%	50%	11%	6%	4%	1%	-

Sources: Waybills, Diarios De Selvicios - I.T.A.

Table 4.3.c

Capacity Offered per Airline Staff Member

1964

Airline / Region	Capacity offered per Airline Staff Member
	'000 Tonnes- Kms
Latin America	
Aerolineas Argentinas	22
LAN	32
LAV	24
EUrope	
Air Franco	51
KLM	62
BOAC	82
BEA	33
North America	
PAA	130
Panagra	67
Air Canada	89
Canadian Pacific	124
North West	187
TWA	144

Source: ICAO Fleet and Personnel Digest of Statistics No. 116 Series FP NO. 18 (and addenda)

Table 4.3.d

Productivity - Scheduled Services Available
(Tonnes - Kilometres per Aircraft Hour)

Airline	1960	1961	1962	1963	1964	1965	1966
Aeroliners Argentinas	1,628	1,818	1,840	1,948	1,918	2,145	2,362
LAB	-	-	-	749	-	1,161	1,131
LAN Chile	1,562	1,742	1,815	1,752	2,001	2,374	2,344
Avianca	1,457	1,774	2,000	1,919	2,028	2,246	2,484
Ecuatoriana	-	-	-	-	-	3,133	3,014
APSA	-	-	-	-	1,963	9,065	8,913
VIASA	-	10,333	9,927	9,149	9,451	10,898	10,590
World Airlines	2,598	3,272	3,843	4,267	4,688	5,158	5,567

Table 4.3.e

Cargo Revenue - Scheduled Services

Airline	Cargo Revenue ($ U.S.), '000 and Percentage of Total Revenue					
	Cargo Revenue	% Total	Cargo Revenue	% Total Revenue	Cargo Revenue	% Total Revenue
	1962		1965		1967	
Aerolineas Argentinas	-	-	-	-	15,484	11.5
L.A.B. Boliviana	-	-	-	-	-	-
L.A.N. Chile	7,871	13.1	13,393	22.8	16,660	22.6
Avianca	34,845	16.7	38,239	17.3	39,193	26.4
Ecuatoriana	-	-	875	5.9	746	6.3
Apsa	-	-	2,613	6.1	5,516	9.5
Viasa	-	-	7,167	8.0	11,709	19.8
Average	21,359	14.9	12,457	12.0	14,885.3	16.02

Source: I.C.A.O. Statistics - 1962, 1965, 1967

Table 4.3.f

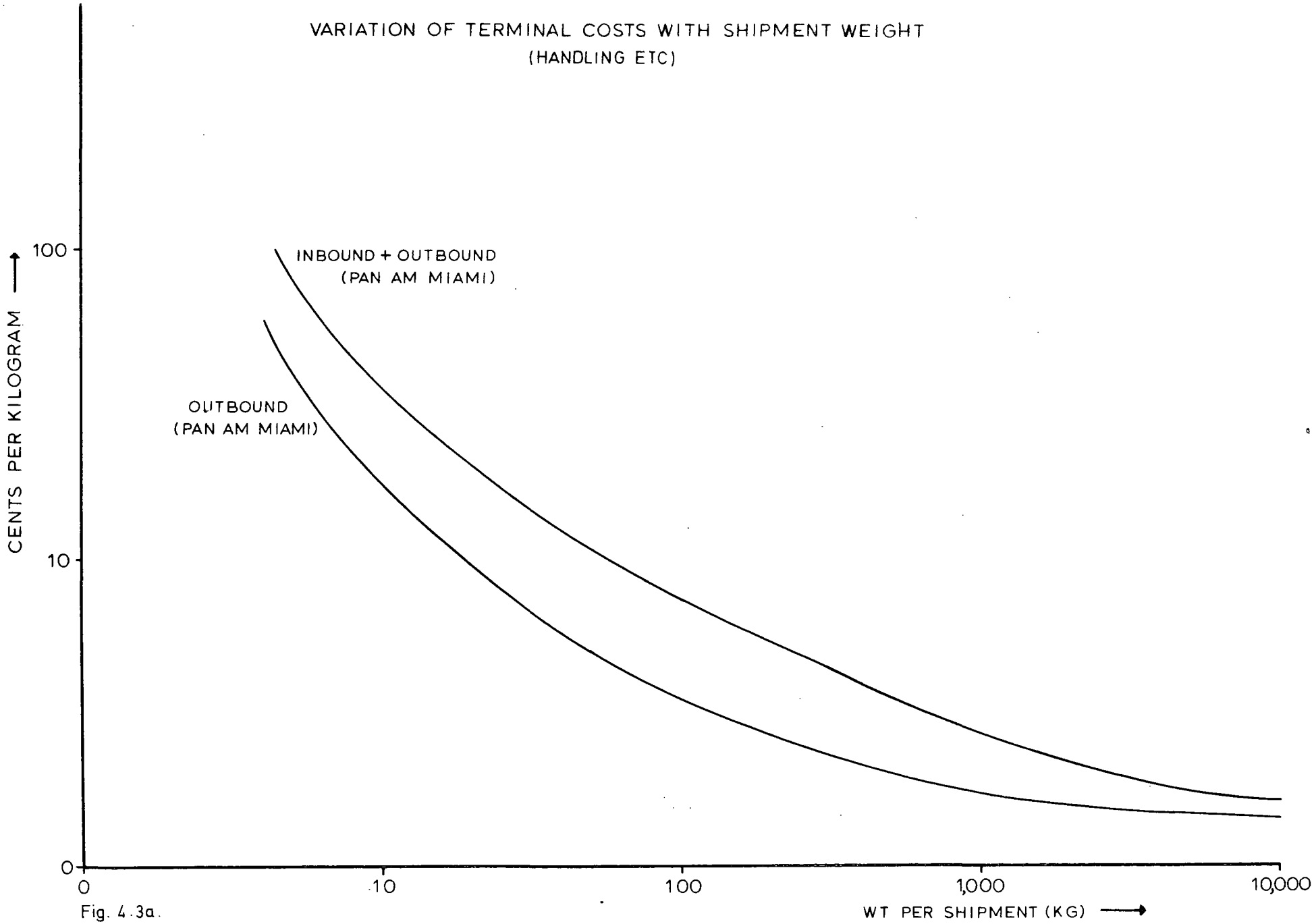

VARIATION OF TERMINAL COSTS WITH SHIPMENT WEIGHT
(HANDLING ETC)
INBOUND + OUTBOUND
(PAN AM MIAMI)
OUTBOUND
(PAN AM MIAMI)
CENTS PER KILOGRAM
100
10
0
0
10
100
1,000
10,000
WT PER SHIPMENT (KG)

Fig. 4.3a.

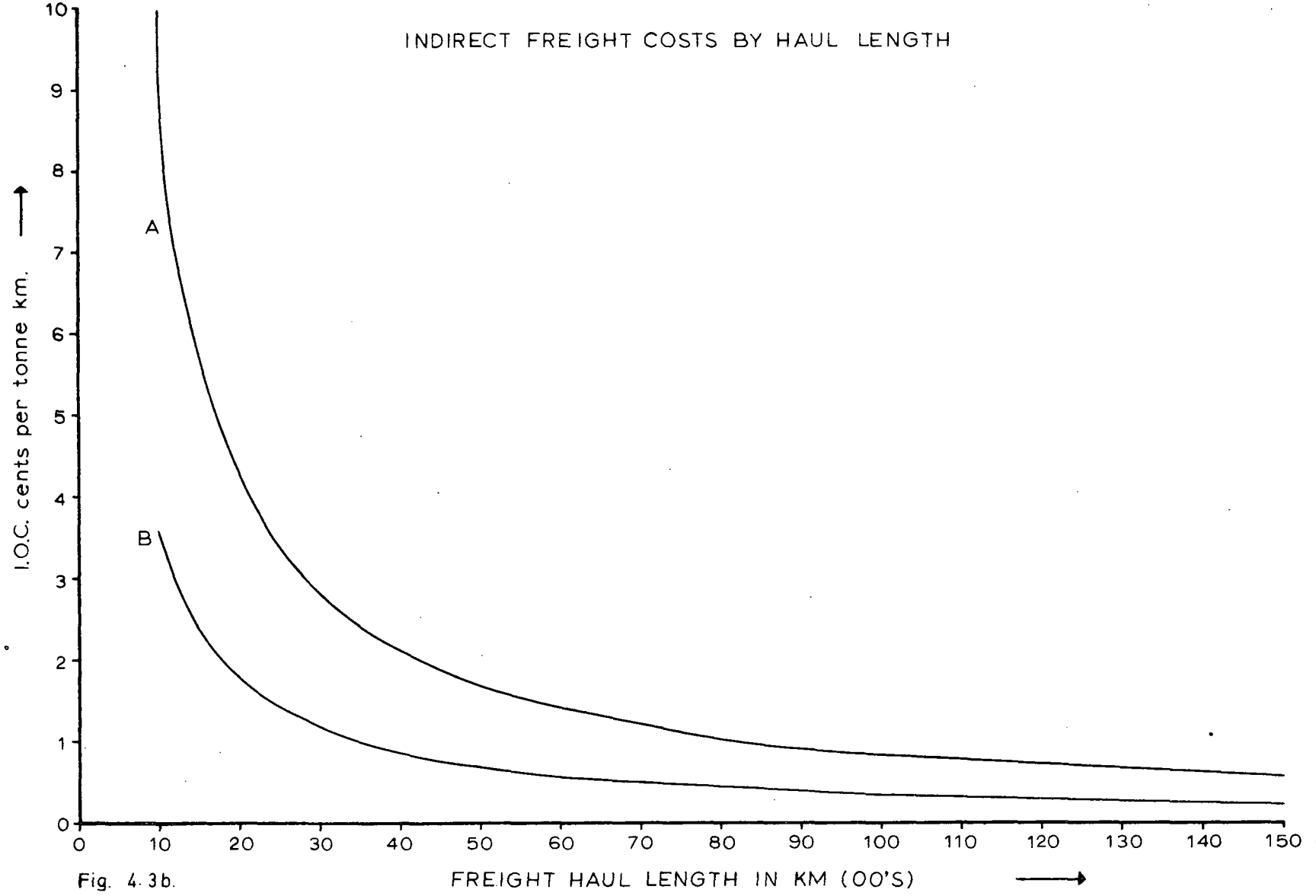

INDIRECT FREIGHT COSTS BY HAUL LENGTH
I.O.C. cents per tonne km.
A
B
0
1
2
3
4
5
6
7
8
9
10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
FREIGHT HAUL LENGTH IN KM (00'S)

Fig. 4.3b.

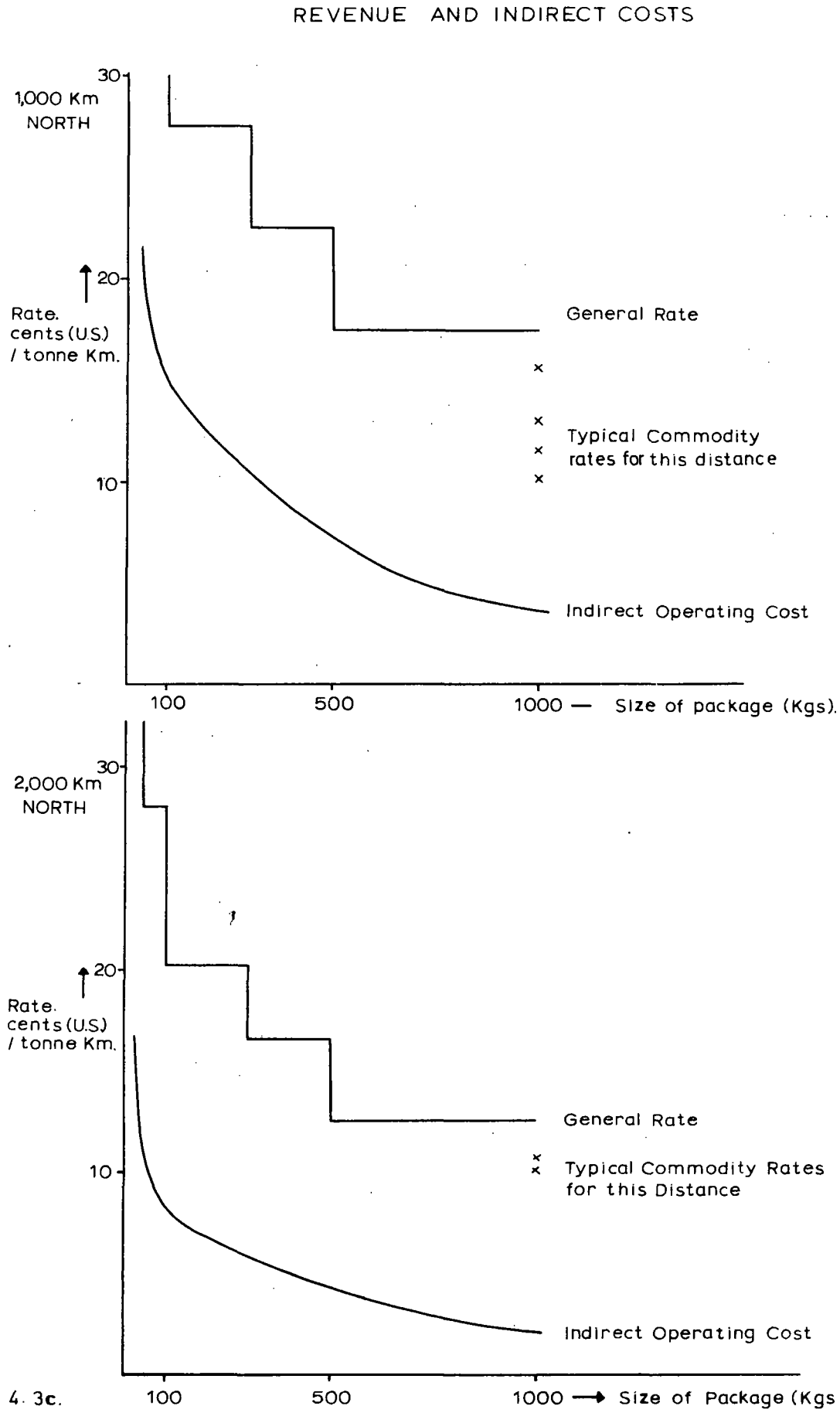

REVENUE AND INDIRECT COSTS
30
1,000 Km
NORTH
20
Rate.
cents (U.S.)
/ tonne Km.
10
General Rate
Typical Commodity
rates for this distance
Indirect Operating Cost
100
500
1000 — Size of package (Kgs).
30
2,000 Km
NORTH
20
Rate.
cents (U.S.)
/ tonne Km.
10
General Rate
Typical Commodity Rates
for this Distance
Indirect Operating Cost
100
500
1000 → Size of Package (Kgs).

Fig. 4. 3c.

SECTION 5

AIR FREIGHT CAPACITY REQUIRED

AT LEAST UNTIL 1976, MOST OF THE INTERNATIONAL CARGO CARRIED BY THE FALAC COUNTRIES WILL BE IN PASSENGER AIRCRAFT.

FOR EACH OF THE FALAC EAIRLINES IT IS PROBABLE THAT A MINIMUM GROWTH OF BELLY-HOLD CAPACITY WILL RESULT FROM A SUPPLY OF

a. 22.5 KILOGRAMS CAPACITY PER PASSENGER

and

b. A PASSENGER TRAFFIC GROWTH RATE OF 11% PER ANNUM.

THESE CAPACITY ESTIMATES WILL NOT BE GREATLY AFFECTED BY THE INTRODUCTION OF NEW TYPES OF AIRCRAFT INCLUDING THE BOEING 747.

ASSUMING THAT INTERNATIONAL AIR CARGO TRAFFIC GROWS AT 16% PER ANNUM, EVEN IN 1975 A SINGLE UNIT OF ALL CARGO AIRCRAFT OF THE TYPES BOEING 707 OR DOUGLAS DC-8 WILL OFFER AS MUCH CAPACITY AS THAT REQUIRED FOR THE SEVEN AIRLINES TOGETHER. INDIVIDUAL CARRIERS CANNOT OPERATE MODERN LOW-COST CARGO AIRCRAFT PROFITABLY ON INTERNATIONAL ROUTES.

THE BEST ROUTE, SERVING MOST OF THE SEVEN COUNTRIES, WHILE STILL BEING COMMERCIALLY VIABLE, IS FROM BUENOS AIRES TO NEW YORK.

BECAUSE OF THE HIGH PRODUCTIVELY OF MODERN ALL-CARGO AIRCRAFT, ONLY ROUTES OF HIGH TRAFFIC DENSITY ARE LIKELY TO SUSTAIN COMPETITIVE FREQUENCIES AND TO BE PROFITABLE.

JOINT INTEGRATED OPERATIONS OF THE FALAC CARRIERS OFFERS THE PROMISE OF

a. SCALE ECONOMIES ON THE OPERATION OF ALL-CARGO AIRCRAFT BY EFFECTIVELY POOLING THEIR MARKET SHARES.

b. INCREASING THEIR JOINT MARKET SHARE BY JOINT POLICIES AND MARKETING ECONOMIES OF SCALE.

SECTION 5

AIR FREIGHT CAPACITY REQUIRED

Index

5.1 Capacity on Passenger Aircraft - Belly-hold Capacity

5.1.1 The majority of international air freight in the region is carried on passenger aircraft. The higher growth rate of air freight compared to passengers on international routes, roughly 16% to 11%, will eventually reverse this proportion so that most freight will be carried on all-freight aircraft.

5.1.2 However, at least for the next decade, the air freight capacity of passenger aircraft will be a major factor in total air freight capacity.

5.1.3 The growth of air freight capacity in this passenger sector will depend almost entirely on passenger growth and not on freight demand growth

5.1.4 The higher earnings rate of passenger traffic compared to freight traffic on passenger aircraft, will ensure that the response of supply to demand in this passenger sector - the purchase of new equipment, the increase in frequencies, the addition of routes - will be governed by passenger demand and growth almost entirely.

5.1.5 Hence we can assume that capacity in mixed aircraft can be derived from a distinct forecast of passenger growth.

5.1.6 Freight Capacity on Mixed Aircraft on FALAC Routes

Much of the international passenger traffic presently carried by all the passenger carriers, FALAC and NON-FALAC, is in all-jet aircraft Assuming that passenger load factors average out at 50% and freight and mail has a minimum average density of 9lbs/ft., then the capacity available for freight and mail will, on average, be 32.4 Kilos/passenger (see appendix A.2).

5.1.7 Similarly, if the passenger load factor is 60%, then under the same assumptions of freight density the capacity available is 28 kilos per passenger.

5.1.8 This figure, of course, represents the capacity available for modern all-jet aircraft. Some FALAC routes are presently operated by turbo-prop aircraft (i.e. routes out of La Paz and Quito operated by LAB and Equatoriana). However, inclusion of the Lockheed Hercules does not materially alter this average figure of freight capacity offered.

5.1.9 We cannot attempt to predict in detail the aircraft likely to be purchased over the next period in the light of the individual airlines inability to do so.

5.1.10 However the aircraft types 2 - 6 in Table A.2a. (Appendix A.2) are likely to be representative of the passenger equipment which might be purchased.

5.1.11 This figure of 32.4 Kilos capacity/passenger can be compared to a figure of 22.5 Kilos/passenger used for U.S. International Airlines as actual carryings, not capacity, in the Lockheed Report 'Air Cargo Growth Study'.

5.1.12 Using 32.4 Kilos capacity per passenger would mean that on an average flight of aircraft types presently used, with an average passenger load factor of 50% i.e. 71 passengers, 2,310 Kilograms of cargo capacity would be offered.

5.1.13 In a later section the figure of 22.5 Kilos/passenger is used for belly-hold capacity estimation. This must be considered as extremely conservative.

5.2 Growth in Passenger Demand and Freight Capacity

5.2.1 We can consider two frameworks in examining growth in capacity:-

1. The individual airlines, examined separately and also in terms of a representative 'average' airline, over the entire system.
2. The growth of capacity overall, by sector, on a chosen FALAC route system.

In this Section, the individual airlines are examined.

5.2.2 The recent historical growth rates of individual airlines, suggest that passenger growth rates in the immediate future will vary quite markedly between the FALAC airlines.

Airline	International Passenger Traffic Growth Rate in Passengers Carried	
	1964-1965	1965-1966
	Annual Percentage	
Aerolineas Argentinas	4	11
Aerolineas Peruanas	-	6
Avianca	4	12
Ecuatoriana De Aviacion	-	15
Lan Chile	5	5
Lloyd Aereo Boliviano	-	4
Viasa	22	13

Source ICAO

5.2.3 However, many factors will tend to reduce these differences in growth rates:-

a. The extension of routes by each airline will lead to more sectors on which there will be direct competition.

b. Competitiveness due to extra frequencies will diminish as the routes become 'frequency saturated'.

c. An environment of strong competition with little 'supply' effects on competitiveness will lead to some communal 'rationing' of the market and growth rates.

5.2.4 We will therefore presume that the international passenger traffic of all the FALAC airlines will grow at 11% averaged over future periods extending to 1975 and 1980.

5.2.5 Assuming that the employable capacity available for freight will be, on average, a minimum of 22.5 Kilos/passenger, the passenger growth will generate the freight capacities shown in Table 5.2a.

5.2.6 This capacity will be available to meet the expected increase in cargo demand

Cargo Capacity on Passenger Aircraft Forecast

Country	Airline	1966		1975		1980	
		Pax-Km ('000)	Tonne-Km ('000)	Pax-Km ('000)	Tonne-Km ('000)	Pax-Km ('000)	Tonne-Km ('000)
Argentina	Aerolineas	507	11.4	1,297	29.2	2,185	49.2
Bolivia	LAB	18	0.4	46	1.0	78	1.8
Ecuador	CEA	74	1.7	189	4.3	319	7.2
Chile	LAN	155	3.5	397	8.9	668	15.0
Colombia	Avianca	400	9.0	1,023	23.0	1,724	38.8
Peru	APSA	441	9.9	1,128	25.4	1,901	42.8
Venezuela	VIASA	430	9.7	1,010	24.8	1,853	41.7

Table 5.2a

Table 5.2a

5.3 FALAC Airlines Freight and Mail Growth Rates

5.3.1 Applying the set of annual growth rates, 12%, 16% and 20% to the total 1966 international traffic of each of the FALAC airlines produces the forecasts for 1975 and 1980, shown in Annex I.

5.3.2 These growth rates are described in the ICAO report, 89-AT/15, as covering the probable range of cargo growth rates to 1980. They are also consistent with the forecasts of total industry traffic by route in Section 3.

5.3.3. The forecasts in Annex I are of freight only. Extending the forecasts by including mail and excess baggage and assuming that:-

1. 16% growth rate is most probable for freight.

2. Mail will grow at a smaller rate than freight.

3. Excess baggage will grow at 11% per annum, the same as the assumed passenger growth rate.

produces the forecasts for freight and mail shown in Table 5.3a.

5.3.4 In the same Table, 5.3a., are shown the forecasts, for the same years, of cargo capacity on passenger aircraft and the resulting theoretical requirements for all-cargo capacity. The estimated productivity of a range of all-freight aircraft piston, turbo prop, and jet under reasonable assumptions of payload, block speed and utilisation are shown in Table 5.3b.

5.3.5 In 1966, only Avianca has a major requirement for all-freight aircraft for international routes. By 1975, this will apply to other airlines but the productivity of operating low-cost modern aircraft (essential to break even on the present rate structure) is so high (see Table 5.3b.) that these other companies can only support even a single unit of such equipment by using them jointly on domestic and international services. Such a diffuse method of operation must restrict the competitiveness of the aircraft on international routes.

5.3.6 Even for the entire seven airlines operating together, the 1966 figures indicate balance between demand and capacity offered in all-freight aircraft. Figure 5.3a. illustrates how the all-freight capacity required for the sum of all the international services of all the FALAC operators only reaches sizable proportions in 1975, and can be matched by a single unit of the larger cargo aircraft (Boeing 707-320C, DC8-63F etc.) operating under entirely realistic conditions of load and utilisation.

5.3.7 It must be borne in mind that the belly-hold capacity estimates are very pessimistic (using 22.5 kgs. per passenger) and hence that the requirement of all-freight aircraft by the FALAC airlines is not an underestimate.

5.3.8 Although chronic capacity shortages have been reported on certain sectors notably Bogota - Lima and between Panama and Miami, it is probable that they do not change the overall demand/capacity supplied picture. Although no clear indication can be given of the extent of such repressed demand it is certainly localised, co-exists with incomplete utilisation of all available capacity, and in the case of the Bogota - Lima sector, largely represents carcass meat and is subject to possible restrictions

Forecast of Cargo Demand (Freight + Mail), and Forecast of Capacity on Passenger Aircraft and Theoretical Resulting All-Cargo Demand

Country	Airline	1966			1975			1980		
		Freight + Mail Cargo Demand	Cargo Capacity in Pax. Aircraft *	Theoretical All Cargo Capacity Required	Freight + Mail Cargo Demand	Cargo Capacity in Pax. Aircraft *	Theoretical All Cargo Capacity Required	Freight + Mail Cargo Demand	Cargo Capacity in Pax. Aircraft *	Theoretical All Cargo Capacity Required
Argentina	AEROLINEAS	8.56	11.41	-2.85	35.42	29.18	6.24	63.47	49.16	14.31
Bolivia	LAB	0.28	0.41	-0.07	1.07	1.04	0.03	2.25	1.76	0.49
Chile	LAN	3.93	3.49	0.44	14.95	8.93	6.02	31.4	15.03	16.37
Colombia	AVIANCA	16.29	9.0	7.29	61.92	23.02	38.90	129.95	38.79	91.16
Ecuador	CEA	0.96	1.67	-0.71	3.65	4.25	-0.60	7.73	7.18	0.55
Peru	APSA	4.52	9.92	-5.40	17.14	25.38	-8.24	36.11	42.77	-6.75
Venezuela	VIASA	11.93	9.68	2.25	45.2	24.75	20.45	95.37	41.69	53.68
TOTAL		46.47	45.58	0.89	179.35	116.55	62.80	366.28	196.38	169.90

* Assuming 22.5 kgs/pax.

Data in Tonne-Km ('000,000)

TABLE 5.3a

Productivity of Various Representative Cargo Aircraft

AIRCRAFT	Block/Speed (84% Cruise) Km per Hour	Maximum Pay Load at 9lbs. /cu.ft. Kgs	60% Pay Load Maximum Kgs	Productive Capacity Tonne Km per Hr.	Theoretical Output at 3,000 Hrs/Year Tonne-Km '000
Boeing 747-F	796	97,070	58,300	46,400	139,200
Boeing 707	745	43,545	26,150	19,460	58,400
Douglas DC-8-F	737	43,219	25,950	19,860	59,600
Douglas DC 8-63-F	785	48,682	29,150	22,850	68,500
Douglas DC-6A	379	12,782	7,660	2,900	8,700
DC4	298	7,711	4,620	1,378	4,130
Douglas DC-930-F	706	13,460	8,070	5,690	17,080
Boeing 727 100C	770	15,386	9,220	7,110	21,320

Assumptions 60% Maximum Payload
Block Speed = 0.84 Maximum Speed

Table 5.3b

Table 5.3b

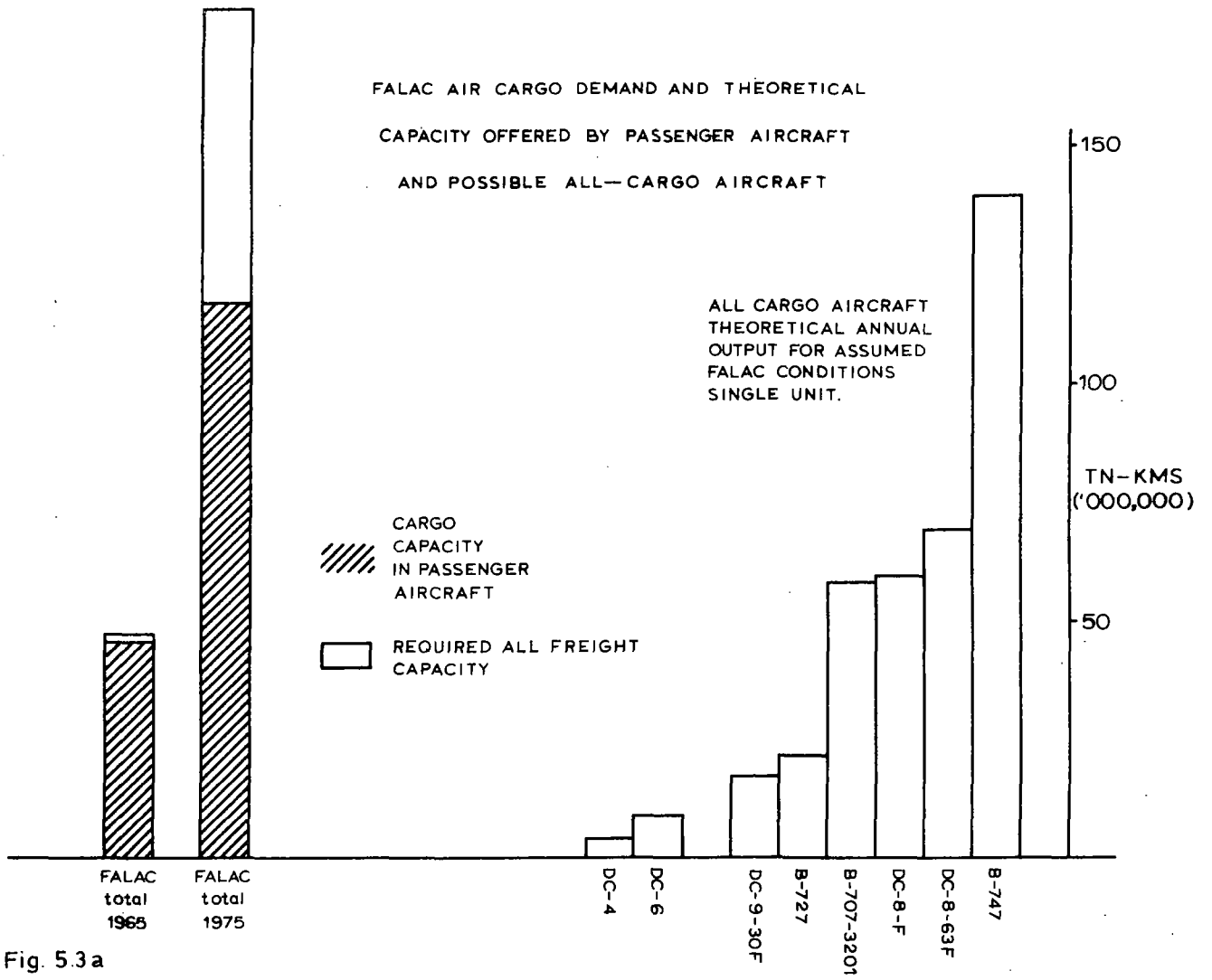

FALAC AIR CARGO DEMAND AND THEORETICAL
CAPACITY OFFERED BY PASSENGER AIRCRAFT
AND POSSIBLE ALL—CARGO AIRCRAFT
ALL CARGO AIRCRAFT
THEORETICAL ANNUAL
OUTPUT FOR ASSUMED
FALAC CONDITIONS
SINGLE UNIT.
CARGO
CAPACITY
IN PASSENGER
AIRCRAFT
REQUIRED ALL FREIGHT
CAPACITY
150
100
50
TN-KMS
('000,000)
FALAC
total
1968
FALAC
total
1975
DC-4
DC-6
DC-9-30F
B-727
B-707-3201
DC-8-F
DC-8-63F
B-747

Fig. 5.3a

5.4 The Need for Joint Operation in All-Cargo Equipment

5.4.1 Summarising, the FALAC airlines transport international cargo - at present almost entirely in passenger aircraft - between a large number of stations. It is evident that, even allowing for a high growth rate to 1975 and 1980, the total FALAC international traffic will be, by world standards, relatively modest.

5.4.2 However all-cargo capacity will be required. Competitive non-FALAC carriers are already providing this capacity on FALAC routes. The average individual FALAC airline will, in order to protect this share of what is clearly, in the long-term, a profitable area, be drawn towards the purchase of modern all-cargo aircraft. However, the productivity of even a single unit of all-cargo aircraft is so high that even the large FALAC airlines will require to increase their market shares to produce sufficient service to break even. Clearly this is impossible for all the airlines, competing as they do on many sectors.

5.4.3 Joint integrated operations of the FALAC carriers offers the promise of:-

a. scale economies on the operation of modern all-cargo aircraft by effectively pooling their market shares

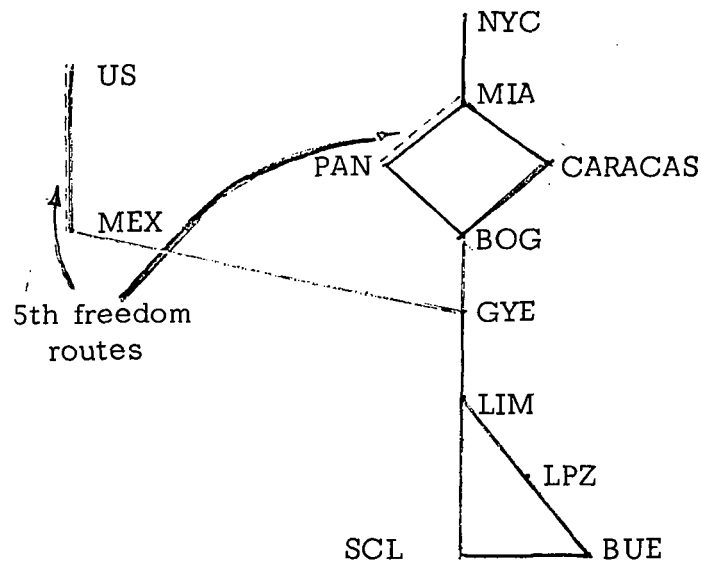
b. increasing their joint market share by joint policies and marketing economies of scale.

5.4.4 Even operating as a unit the FALAC all-cargo operation must confine itself to routes of high traffic density sectors if it is to offer a high enough frequency to be competitive and hence capture adequate revenue. A possible routing for co-operations is now considered in Section 5.5.

5.5 A Possible FALAC Routing

5.5.1 Examination of the traffic patterns suggests that the one route both likely to sustain a modern all-cargo operation, and potentially link all seven FALAC countries, might be a north-south route joining Buenos-Aires, Santiago, Lima, Guyaquil, Bogota with a lower frequency service Buenos-Aires, la Paz, Lima.

5.5.2 Northwards from Bogota could include either Panama City or Caracas, with Miami and New York as the United States end of this route, and perhaps a Mexico/United States route as part of the pattern.



5.5.3 This route is considered purely for illustrative purposes. The actual routing would involve an entirely distinct route-study, which could however use the traffic data and forecasts in Section 3 but consider specific aircraft types.

5.5.4 Again for illustrative purposes, it could be more specific and assume that Viasa would be unwilling to consider opening up its routes and traffic to FALAC and so consider that routing north from Bogota to Miami might by-pass Caracas and include, (not on the same service), the Central American city of Panama. Mexico might also be included in this route pattern.

5.5.5 There would be obvious advantages in including the very large traffic (fifth freedom to the FALAC airlines) between the two cities Mexico and Panama, and the United States in the FALAC structure.

5.5.6 Several FALAC airlines already operate on these sectors.

5.5.7 Total Industry Cargo Traffic Available to FALAC

The industry sector traffic available to the FALAC partners on this route is shown in Figure 5.5a. for 1967.

5.5.8 This Figure 5.5a. ignores European traffic, but presumes that all the Origin-Destination cargo traffic between the listed countries is available to such a route. Hence it is assumed that the capital and other major airports dominate, or would competitively dominate, the international air freight between the listed countries.

5.5.9 In figure 5.5a the diagrams A and E describe the sector traffic where the flight is made directly from Bogota to Miami. B and G describe the additional effects of including Panama and Mexico in the route pattern.

5.5.10 C and F allow for La Paz in the route pattern, and D and H assume that Caracas is a station on the route but that Caracas - U.S. traffic is unavailable to FALAC.

5.5.11 The shaded areas indicates U.S. origin and destination traffic. Clearly this U.S. - bound traffic dominates the northbound route from Lima onwards. This U.S. dominance is also true southbound over the entire system except for the sectors from Bogota to Lima.

5.5.12 The additional effects of including Mexico and Panama in a FALAC routing are clearly enormous. In fact, most of the traffic is dominated by Mexico rather than Panama. (85% northbound and 65% southbound). The major portion of this additional traffic is not generated within the FALAC countries, although this is clearly useful, but is purely between Mexico and Panama and the U.S. i.e. 5th freedom traffic to all the FALAC airlines.

5.5.13 Growth to 1975 and 1980

The forecast to 1975 and 1980, Figure 5.5b and Table 5.5a, although including growth on all sectors involves some changes in importance of certain sectors.

5.5.14 Figure 5.5c indicates that to northbound traffic the southern sectors Buenos Aires to Santiago and Santiago to Lima will assume less importance.

5.5.15 The U.S. traffic, whether of imports or exports, will continue to dominate traffic on this route both for 1975 and 1980.

5.5.16 Growth in Passenger Demand on this FALAC route

Cargo capacity on passenger aircraft will be extremely important, in the supply position, for at least the next few years.

5.5.17 All the available statistics on origin-to-destination passenger movements have been collated, the recent growth rates examined and projections made to 1975 and 1980, based on these, manufacturers' studies for the airlines and also individual airline studies.

5.5.18 From these projections, an estimate of 11% per annum has been made for the overall growth rate in passenger movements from the FALAC countries to and from the United States.

5.5.19 From an examination of the existing route patterns, changes in sector traffic on the north-south route in passengers, for the entire industry were estimated for 1975 and 1980, and also the resulting equivalent sector belly-hold capacities calculated.

5.5.20 Passenger flights serving stations on this route both diverge and converge from it at certain points so that belly-hold freight capacity is not available to all sectors. The belly-hold capacity estimates in Table 5.5b include these effects.

5.5.21 Estimation of all-cargo Capacity Required on Buenos Aires-New York Route

A greatly increased attainable market share for an integrated FALAC operation on this route can be postulated both in 1967 and 1975, nearing 65% on sectors from Santiago to Bogata and being rather smaller than from Panama to Miami and also assuming that rather less of the United States bound traffic from Buenos Aires is available to this FALAC route (due to routes north through Asuncion and the East coast).

5.5.22 This is only 'attainable' to a FALAC system, offering over this route extremely competitive services including regular all-freight operations.

5.5.23 At present (February 1969), one northbound Braniff 707 from Buenos Aires and the LAN Chile DC-6 from Santiago operate, but Braniff will certainly be offering higher frequencies by 1975 and the high 'attainable' market shares assume that these will be at least matched.

5.5.24 A further assumption is that FALAC all-freight services will operate through Miami to New York.

5.5.25 In Table 5.5b., is shown the sector traffic and the attainable FALAC traffic on the assumptions in 5.5.21.

5.5.26 On the same Table is shown the cargo capacity offered as belly-hold on passenger flights (column C).

5.5.27 Because of higher frequencies and lower marginal cost, it is assumed that such capacity will take precedence over all-freight capacity.

5.5.28 As shown in Column D of Table 5.5b., the resulting all-cargo capacity requirement, in a northbound direction, only exists at present over the Buenos Aires to Santiago and Santiago to Lima sectors. Southbound the position is somewhat more demanding of all-freight capacity. This arises because the imbalance of air freight, north-south, is not matched by a similar passenger imbalance.

5.5.29 By 1975, substantial volumes of all-freight demand would be available to a FALAC operation.

TOTAL INDUSTRY AIR CARGO FOR 1967 AND 1975
ON PRESUMED ROUTE - BUENOS AIRES TO UNITED STATES

NORTHBOUND SECTORS FROM - TO	1967 Tonnes	1975 * Tonnes
BOG-US	2,590	24,434
GUY-BOG	2,234	16,607
LIM-GUY	2,113	12,861
SAN-LIM	3,774	12,523
BUE-SAN	5,503	13,212
TOTAL ROUTE Tonnes/Kms	23,276,519	136,531,703
SOUTHBOUND SECTORS FROM - TO	1967 Tonnes	1975 * Tonnes
US-BOG	8,094	36,578
BOG-GUY	8,588	41,236
GUY-LIM	7,842	35,713
LIM-SAN	2,532	10,729
SAN-BUE	1,734	6,366
TOTAL ROUTE Tonnes/Kms	45,381,286	204,382,858

KEY
US = United States
BOG = Bogata
GUY = Guayaquil
LIM = Lima
SAN = Santiago
BUE = Buenos Aires

* for 1975 highest projected level estimate taken

ESTIMATION OF ALL-CARGO CAPACITY REQUIRED ON POSSIBLE FALAC ROUTE

		A	B	C	D
		Total Traffic	Attainable FALAC Share	*Cargo Capacity on Passenger flights	All Cargo Capacity Required (B-C)
		Tonnes	Tonnes	Tonnes	Tonnes
1967 Northbound	PAN-US	3,123	1,250	3,781	-
	BOG-PAN	2,766	1,660	3,530	-
	GUY-BOG	2,317	1,390	2,643	-
	LIM-GUY	2,178	1,310	2,241	-
	SAN-LIM	3,813	2,290	1,014	1,276
	BUE-SAN	5,529	2,220	1,086	1,134
1967 Southbound	US-PAN	11,371	4,540	3,192	1,348
	PAN-BOG	8,098	4,850	2,959	1,891
	BOG-GUY	8,683	5,200	1,996	3,204
	GUY-LIM	7,912	4,750	1,614	3,136
	LIM-SAN	2,579	1,550	1,146	404
	SAN-BUE	1,759	750	1,351	-
1975 Northbound	PAN-US	14,737	5,900	10,971	-
	BOG-PAN	13,907	8,350	11,566	-
	GUY-BOG	12,953	7,800	7,555	245
	LIM-GUY	13,234	7,850	6,679	2,171
	SAN-LIM	16,887	10,100	2,178	7,922
	BUE-SAN	24,599	19,850	986	8,864
1975 Southbound	US-PAN	45,810	18,300	9,235	9,065
	PAN-BOG	38,668	23,200	9,487	13,713
	BOG-GUY	42,726	25,600	5,231	20,369
	GUY-LIM	36,698	22,000	3,730	18,270
	LIM-SAN	11,299	6,800	2,669	4,131
	SAN-BUE	6,646	2,660	2,049	611

* Capacity which is expected to be used by mail on passenger flights is not included in these estimates of cargo capacity.

TABLE 5.5b.

SECTOR TRAFFIC ON THE SAMPLE FALAC ROUTE OF AIR CARGO 1967

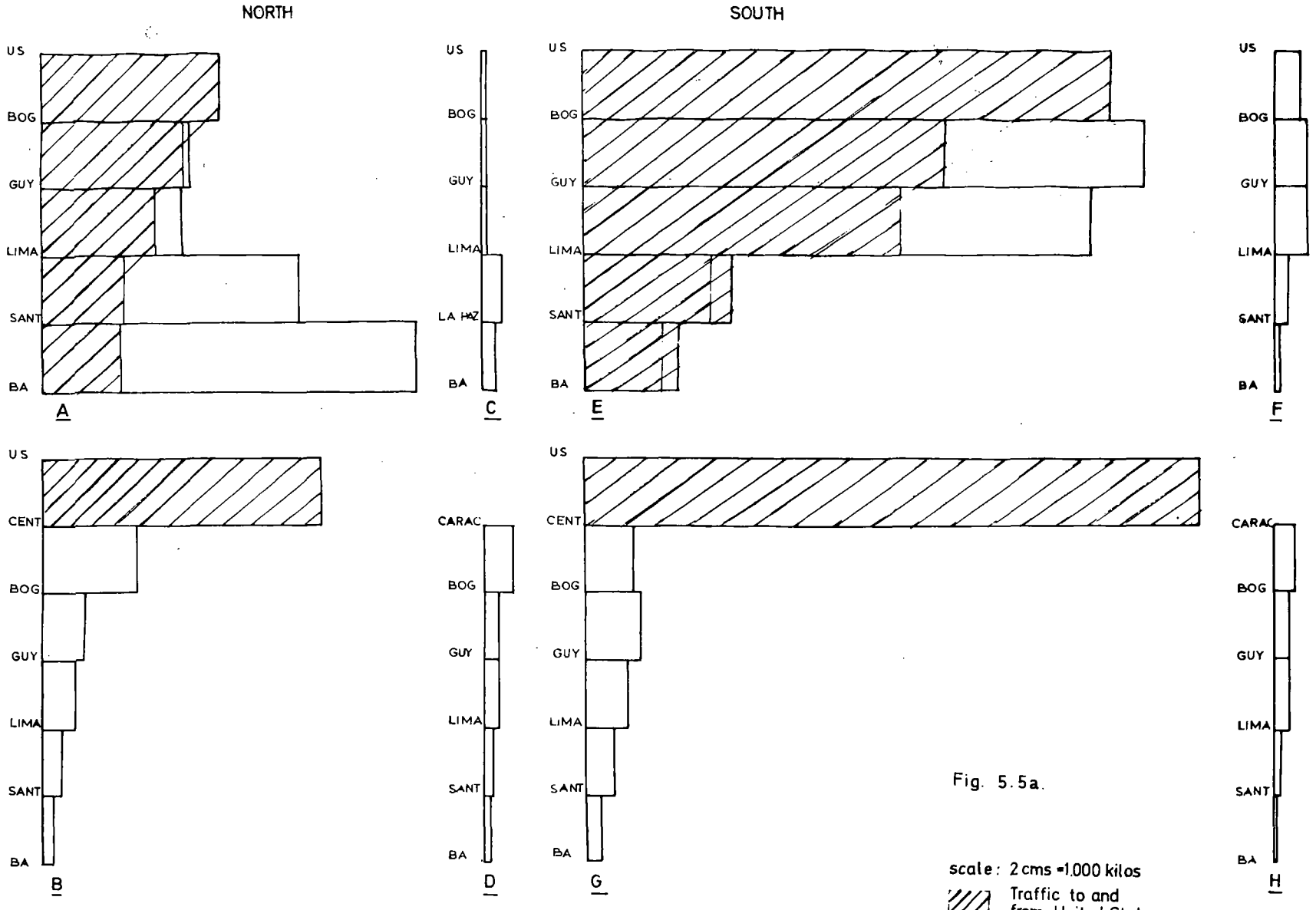


Fig. 5.5a.

scale: 2 cms = 1.000 kilos

Traffic to and from United States

FORECAST OF AIR CARGO BY SECTOR, NEW YORK – BUENOS AIRES
FOR 1975 AND 1980

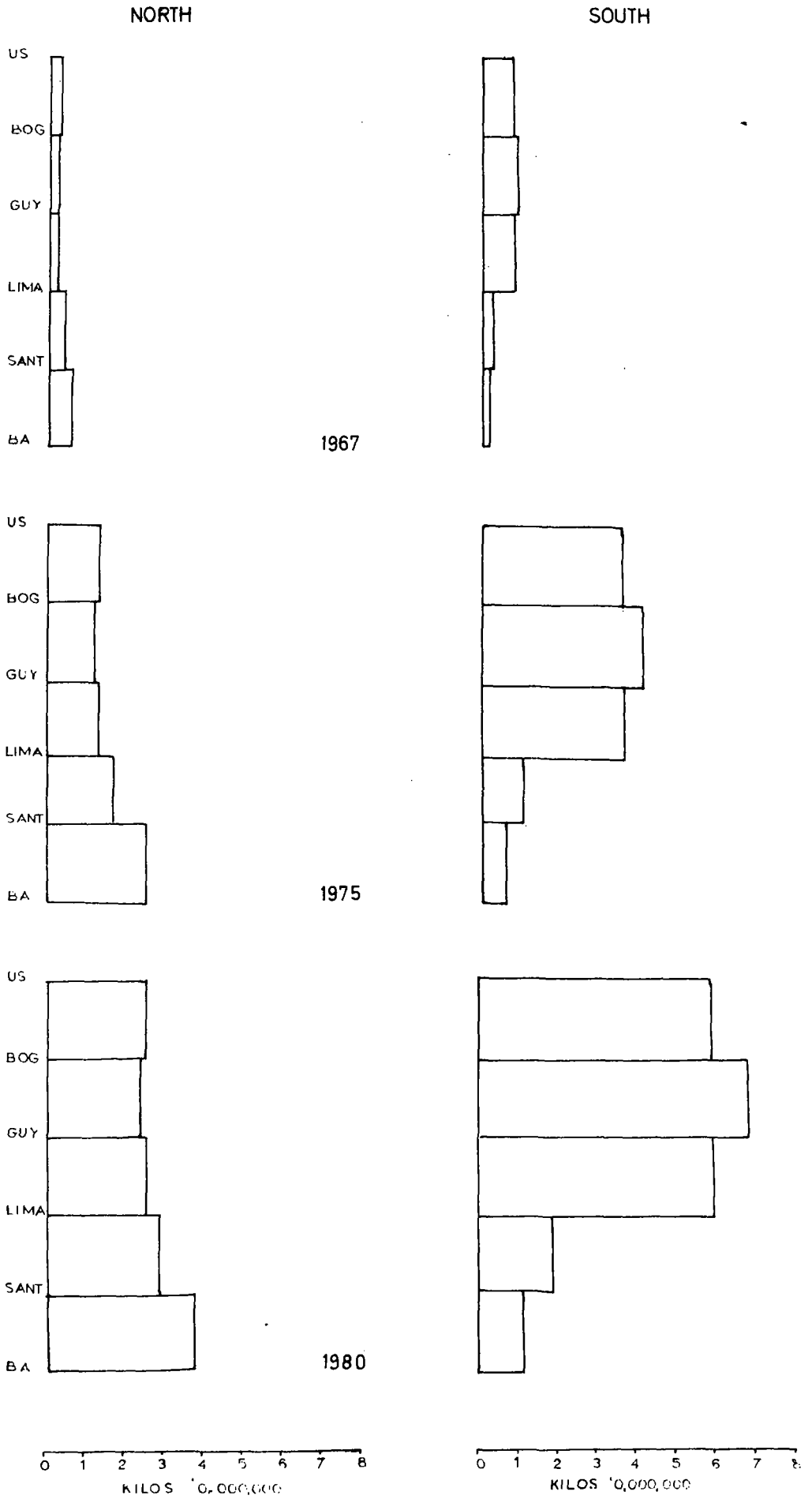


Fig. 5.5b.

DISTRIBUTION OF AIR CARGO BETWEEN SECTORS

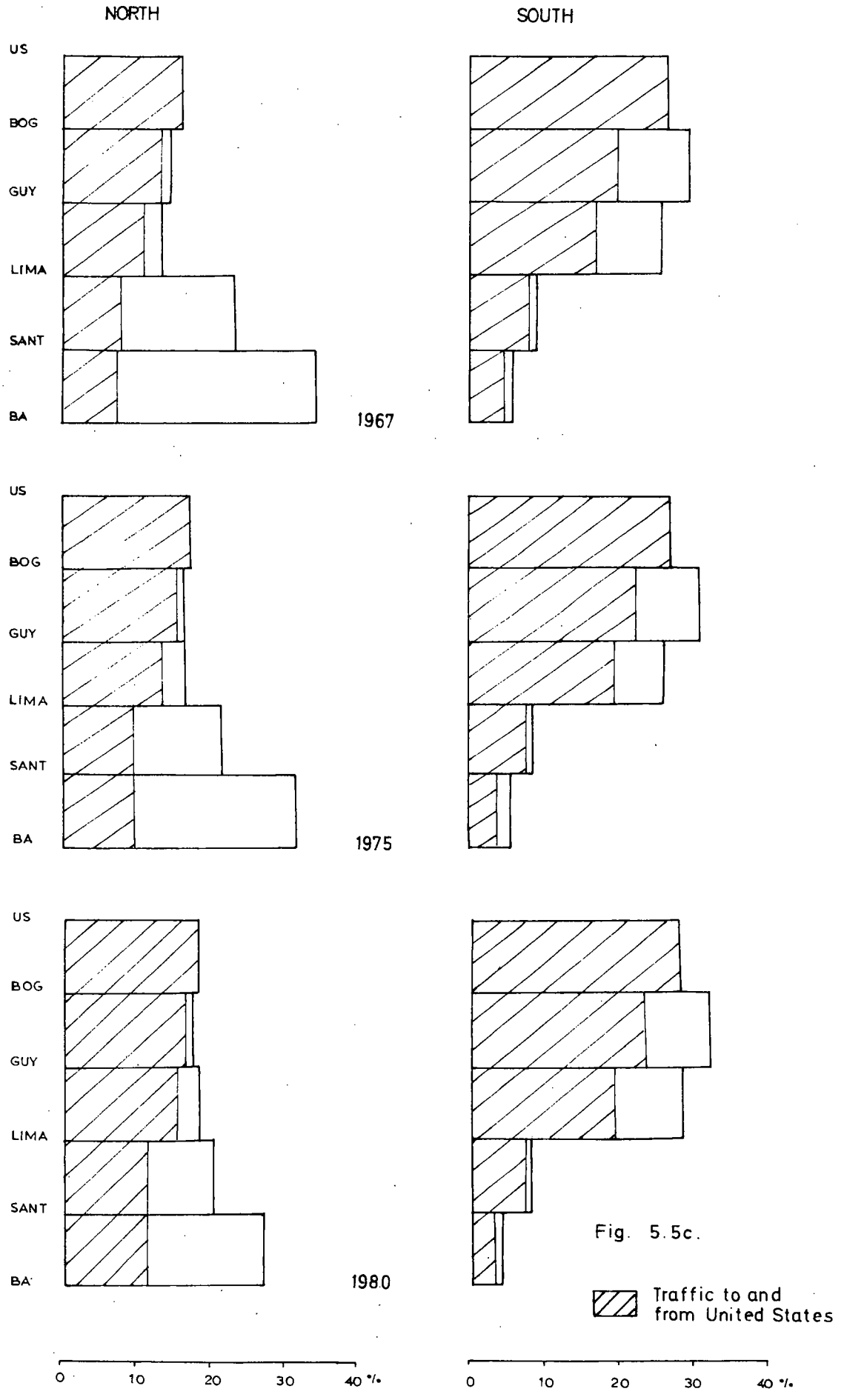


Fig. 5.5c.

SECTION 6

MECHANISMS OF INTEGRATION

SUCCESSFUL OPERATION OF THE TRADITIONAL 'POOL' REQUIRES -

A) A SINGLE ROUTE

B) A SMALL NUMBER OF PARTICIPANTS

C) MONOPOLY OR NEAR-MONOPOLY

NONE OF THESE FACTORS RELATE TO THE FULL, SEVEN-COUNTRY, FALAC SITUATION.

A DISTINCT INTERNATIONAL COMPANY IS PROPOSED,CALLED FOR CONVENIENCE, FALAC. IT IS PROPOSED THAT THIS COMPANY HAVE MONOPOLY OF INTERNATIONAL CARGO TRAFFIC OF THE PARTICIPATING AIRLINES; THAT EACH COMPANY NEGOTIATES, SUBJECT TO ITS OWN PASSENGER REQUIREMENTS, THE LEASING OF ITS BELLY-HOLD CAPACITY TO FALAC; THAT INTERNATIONAL CARGO HANDLING AND MARKETING BE CONTROLLED BY FALAC; THAT FALAC BE SOLELY RESPONSIBLE FOR OPERATING ALL-FREIGHT AIRCRAFT ON INTERNATIONAL ROUTES.

6. Mechanisms of Integration

6.1 The legal aspects of the proposed FALAC organisation are under study by a legal expert, and it is not intended to prejudge any of his findings. It is however useful to sketch briefly the kind of possibilities which exist, without comment on their political or legal feasibility.

6.2 Of basic importance is the composition of FALAC. This study has been restricted to considering a co-operative enterprise between Aerolineas Argentinas, Lloyd Aereo Boliviana, Lan Chile, Avianca, Ecuatoriana and Apsa. Viasa has also been considered, but in a different category, for the reasons already given.

6.3 It is arguable that other possible compositions for FALAC should be considered further:_

a) a limited FALAC set up by a smaller number of carriers, e.g. Avianca, Ecuatoriana, Apsa and Lan Chile.

b) an extended FALAC to include all the original seven carriers plus those from Brazil, Mexico and Panama.

c) integration in passenger traffic as well as cargo.

6.4 It is possible to envisage the development of FALAC in three distinct mechanisms:

6.5 1. Pools Traffic pools do not involve any change in the legal status of a carrier, and have proved a most valuable commercial airline device throughout the world. The most stable pools are those which, in operation, constitute a monopoly i.e. London-Paris. On most of the routes, the FALAC carriers together, do not have even a majority of the route traffic and would not be able to control the route development. Pooling arrangements are much more convenient for passenger traffic, and some FALAC airlines have developed them exclusively with foreign carriers.

6.6 Pools as such, are almost always separate arrangements for each route. Clearly a FALAC enterprise would involve many routes and as, at present, there are up to five FALAC operators on common sectors, a large number of separate pools and pooling arrangements would be required with multiple participation. These would have to be re-negotiated on entry of other carriers to the route.

6.7 If FALAC were merely to be a name for an extended system of cargo pools, it would not necessarily improve its ability to buy and operate the large and expensive cargo equipment which is essential for survival in the face of foreign competition. Also none of the possible scale economies of handling would apply here.

6.8 Again it has been found by experience that multi-national pools rapidly become extremely complex, and in many cases, have been found to be unworkable. This has been found to be the case with pools of revenue only, and where the formula is extended to cover some cost elements, the complexities become correspondingly greater.

6.9 2. A "SAS-type" Consortium The early history of SAS revealed the problems of an international air consortium, even among as few as three neighbouring countries with much in common. Within the FALAC context an arrangement of this sort is likely to be accompanied by very great problems with respect to the capital participation of each of the members, and the distribution of profits or losses. Differing values of traffic potential, which like all forecasts are open to debate, are likely to lead to the kind of impasse which resulted in the stagnation of the proposed European Air Union.

6.10 3. Multi-national Companies The problems of multi-national companies in Latin America are at the present time receiving extensive study, as part of the drive towards increased economic integration throughout the continent. Despite the many difficulties, a formula of this kind seems the most appropriate for FALAC. It must of course be repeated here that the findings of the legal expert are likely to have a decisive influence on the actual form of organisation adopted. It is felt only a true multi-national organisation can combine the necessary stability with a powerful bargaining position with regard to traffic rights.

6.11 The ultimate success of FALAC depends upon combining a strong competitive position and an efficient commercial and technical operation with safeguards for the interests of the individual partners.

6.12 FALAC must therefore control the use of all the international cargo capacity offered by individual members, whether this is in passenger belly-holds, all-cargo flights or cargo charters. Competition between FALAC on the one hand and any individual FALAC partner is manifestly absurd. The benefits of integration would include the more efficient utilisation of the total cargo capacity, and the rationalisation of cargo sales etc. by using services of individual airlines. Conflict of interests in the airlines' involvement in two competing operations is clearly unworkable.

6.13 It is proposed that FALAC have the sole responsibility for international all-cargo operations and that an immediate and direct source of revenue to the participants would be provided by the leasing of capacity to FALAC. Each airline would be free to judge its own passenger requirements and then lease the available capacity, on the basis of sector or total route, to FALAC. A distinction in the leasing rate would be between short notice and long-term leasing - (the larger cargo organisation of the envisaged FALAC should be able to use the short-notice standby capacity on high density sectors such as BUE-SCL more efficiently than the individual airlines.

6.14 As FALAC will be the monopoly user of the airlines' international capacity it is presumed that it will buy all the capacity offered to it by the participants. This capacity will initially include that of the few existing all-freight aircraft as will the belly-hold capacity in passenger aircraft.

6.15 Probably the simplest method of FALAC absorbing this all-freight capacity is that FALAC purchase these aircraft and redefine route structures for them. Alternatively the individual airlines could restrict the aircraft to domestic operations.

6.16 The FALAC cargo operation, larger than that of the existing individual airlines, should have no difficulty in absorbing additional belly-hold capacity as and when it is offered. The growth rate of this capacity will be less than the growth rate of demand.

6.17 FALAC, as the cargo operation, will meet excess cargo demand by purchase of its own all-freight aircraft. FALAC will define the route pattern of these aircraft as a result of its own estimates of demand patterns.

6.18 Domestic services pose more of a problem. It is likely however that a successful FALAC international operation would encourage individual carriers to co-ordinate their domestic services and conversely the success of FALAC's international services will be greatly affected by the extent of local feeder services into the main cargo terminals. FALAC may be in a position to lease capacity to its partners for domestic flights, or may ultimately operate them.

6.19 This leasing of capacity should be the major revenue source to the airlines as it will be directly related to the realistic opportunity costs, or potential deferred profits,of each participant.

6.20 Further distribution of profits based on equal holding of capital by each partner related to paid-up capital and the origin and destination of the traffic should provide the necessary conditions for stability. The precise formulae must be deferred until the participants reaffirm their support.

6.21 It must be acknowledged that each country, and therefore its flag carrier, has distinct national aspirations in air transport. Section 2 has indicated the vastly different sizes, rates of growth, profitability and areas of interest of the seven carriers. The combination of these factors, coupled with nationalism and political uncertainties clearly adds up to a strong disincentive for an individual airline committing its future even in a restricted area. In operation, the disruptive forces (which are present in any joint commercial undertaking of this nature) would probably be stronger than,for example, between the African states participating in Air Afrique or the Scandanavian countries in SAS.

6.22 Hence, any really integrated operation, to succeed, must:-

1. offer continous long-term benefits to participants and
2. be resistant to short-term political factors
   a) within the member airlines
   b) within each country

6.23 Clearly this last factor demands that there be a distinct corporate identity with each participant having sufficient capital stake to provide an effective guarantee. This points towards a physically located company with its own secretariat. Not wishing to prejudge the legal constraints, we will assume for the rest of this report that such a company is legally feasible and would be the mechanism of integration of air cargo.

6.24 It is to be expected that, even without the establishment of a multi-national airline such as FALAC, Latin American governments will wish to re-examine all bilateral agreements. The establishment of FALAC will necessarily mean the renegotiation of all such agreements. The present bilateral situation is reviewed in Section 7.

6.25 Conclusion

With 6 or 7 possible partners, each with their own history of working commercial relationships, between each other and foreign carriers, increased co-operation offers an almost infinite variety of possibilities. Precise studies of possible organisational arrangements for FALAC have to await the findings of the legal study, but from the purely practical point of view a multi-national company, despite the obvious problems, seems to offer the most hopeful structure.

SECTION 7

COMPETITION AND FALAC MARKET SHARE

THE SEVEN FALAC AIRLINES HOLD VERY SMALL MARKET SHARES ON THE ROUTES ON WHICH THEY FLY.

UNDER EXISTING CONDITIONS THESE MARKET SHARES CAN BE EXPECTED TO DIMINISH.

CO-OPERATION IN A LARGER ENTERPRISE WOULD INCREASE THE JOINT COMPETITIVENESS.

7. Competition and FALAC Market Share

7.1 A study was made of the market share of the total industry air freight traffic of the FALAC airlines, over the routes they were operating up to 1967. Once again, serious problems were encountered through lack of some statistics and some conflict of data on the market share on some major routes. The results of this analysis are shown in Table 7.a.

7.2 The FALAC share of the cargo traffic between the pairs of countries shown is very variable, ranging from 0% to 100%. In general, the traffic both to and from Colombia shows a high FALAC market share (nearly all Avianca in fact) whereas very low shares are shown, mostly below 25%, in traffic to and from Chile.

7.3 The Colombia figures are perhaps rather over-estimates. There is no clear, discernible trend in the FALAC shares over time and there is no obvious pattern in the directional share. Hence in the Chile-United States air trade, FALAC airlines account for 35% of the southbound trade and 23% of the northbound in 1967; of the Colombia-United States trade, there is no clear difference between a northbound 52% and a southbound 65%.

7.4 The future pattern of market shares of the FALAC airlines will depend on:-

a. The route competitiveness of FALAC services.

b. Future developments of a political nature, including licensing.

7.5 The route competitiveness of the FALAC carriers can be described by the factors:-

a. Number of frequencies (on mixed aircraft) compared to the competition.

b. The existence of any cargo services.

c. The number and capacity of cargo services.

d. The degree of connection to feeder and distribution services on other routes.

e. Whether one or both of the route end points is in 'home' territory. (This factor depends on the 'terms of trade' between each country pair, i.e. whether consignees or receivers usually determine the carrier).

f. Quality of service.

7.6 The low market shares of the FALAC carriers is a result of low competitiveness on all of these factors. In particular, the low market shares on the routes to the United States is greatly determined by (d), the need of some FALAC carriers to tranship at Miami, cargo with a predominant origin/destination in the Mid-West or East coast of the United States, as well as the general lack of all-cargo services (b).

7.7 The future competitiveness of the FALAC carriers depends on their degree of improvement, individually or collectively, in the factors (a) to (f), compared to the certain increase in competitiveness of the other non-FALAC carriers.

7.8 The other set of considerations in estimating the future FALAC market share is in the area of individual national policy to aviation and can be termed 'political'.

7.9 Passenger Carryings

Over many years certain countries, notably Peru and Chile, have deliberately operated an 'open skies' policy with regard to air transport. This non-restrictionist policy of licensing air carriers has certainly achieved its aim of developing communications to and from the country, but prompted perhaps by the flag carriers meeting opposition on the expansion of services in other countries,and the flag carriers low market share on home based routes, there is a strong tendency towards restrictionism. Other countries, notably Brazil and Venezuela, have continually maintained hard lines towards granting of licences.

7.10 This growing feeling towards restrictionism probably has its focus directed towards non-regional carriers, Braniff, Pan-Am, Lufthansa, Air France etc., who have come to dominate the international air trade, not only between regions, i.e. to and from the United States and Europe, but also inside the region. The bilateral position of the FALAC carriers tends to be less favourable than that of non-regional carriers (see Table 7.b)

7.11 Cargo Carryings

Until recently, the policies generally among the FALAC carriers on licensing of cargo operation has been much more liberal since -

1. The improvement of freight transport has been considered even more beneficial to the developing economy than passenger transport.

2. Only the non-regional carriers, notably Braniff, have been capable of operating the long distance cargo services.

7.12 Reacting to the low market shares, and with the assumptions that the flag carriers can soon compete in international freight services, the FALAC governments might be expected to re-examine the situation.

7.13 Future Market Shares

The implication of the above factors are now related to two assumptions on possible future operations of the FALAC carriers.

7.14 General estimates of total air cargo demand have been made in Section 3. FALAC traffic can be derived from these estimates by postulating market shares under different sets of assumptions. These sets of assumptions have been simplified into two main cases:-

Case A - FALAC in operation, with all-cargo aircraft, operating trunk-line scheduled all-cargo services, and controlling the use of belly-hold cargo capacity of FALAC airline passenger services.

Case B - FALAC not in operation. Each individual airline competing for traffic, some operating all-cargo services.

7.15 It will be seen at once that case 'A' could greatly strengthen the collective bargaining power of the FALAC airlines with regard to bilateral agreements. The possible effect on the legal framework of air services throughout Latin America of an organisation of the FALAC type cannot be assessed in detail until the findings of the legal study are available, but even at this early stage it can be asserted that a multi-national organisation such as that proposed for FALAC could secure more favourable concessions for its constituent parts than these parts could individually. This is important in view of the expected tendency towards a more protectionist attitude by Latin American Government in the granting of traffic rights.

7.16 One of the strongest arguments for FALAC has been concerned with the increased cost effectiveness of a common marketing effort. FALAC airlines being at present primarily passenger carriers it has been hard to obtain more than a very approximate estimate of the cost of cargo marketing. In practice very limited effort is put into cargo marketing by some FALAC carriers often for the reason that passenger loads are too heavy to permit more than very modest cargo loads to be accepted. Indeed, in some cases cargo has been actively discouraged. The establishment of a FALAC type operation must be accompanied by co-ordination of marketing functions within all of the countries served. It further follows that the FALAC airlines stand to increase their market share due to the establishment of FALAC to a greater extent between two FALAC countries than between non-FALAC country-pairs. FALAC will use the marketing resources of the individual airlines.

7.17 Clearly, the commercial plans of FALAC's competitors cannot be more than guessed at for a period as far ahead as 1975. As mentioned above it can be expected that such competitors will be increasingly restricted in their fifth freedom traffic rights with the result that FALAC fifth freedom rights will in all probability be correspondingly limited. It is likely that individual Governments will not put the needs of FALAC at a higher priority than those of its own national carriers or above broad national objectives, in the negotiation of bilaterals.

7.18 <u>The Airlines Without FALAC - Case B</u>

The probable long-term situation of the individual airlines will be one of declining market shares. To counter this in the short-term the airlines will attempt to increase the quality of their supply by purchasing all-cargo aircraft. The resulting over-capacity and financial difficulties will actually decrease their competitive position vis-a-vis the more powerful extra-regional carriers.

7.19 Restrictionist policies on licencing can not be successfully directed against North American carriers since the United States dominates the air cargo traffic. However, a danger exists of such policies directed reciprocally within the region.

7.20 Bearing in mind the above assumptions, national market shares can be imputed to the total carryings of all FALAC carriers for 1975, for both Case A (with the establishment of FALAC) and Case B (without FALAC). This comparison is shown in Table 7.c. These shares should be regarded as reasonably attainable targets rather than forecasts.

FALAC MARKET SHARES OF TOTAL INDUSTRY AIR FREIGHT

(Inter-capital or average of Capitals and other Major Cities) Percentage

FROM	Peru	Chile	Argentina	Ecuador	Venezuela	Colombia	Bolivia	C.America	U.S.	Europe	Rest of South America
Peru		1964/23% 1965/44% 1967/33%				1967/59% 1968/31%	1963/13% 1964/12%				
Chile	1964/12% 1965/18% 1967/11%		1964/20% 1965/6% 1967/29%	1964/2.5% 1965/26% 1967/49%	1964/0% 1965/17% 1967/0%	1964/1.3% 1965/10.3% 1967/55%		1964/4% 1965/3.8% 1967/16%	1964/94% 1965/10.8% 1967/23%	1964/0% 1965/0% 1967/0%	1964/20% 1965/36% 1967/19%
Argentina		1964/17% 1965/9% 1967/15%				1967/100% 1968/100%					
Ecuador		1964/1% 1965/83% 1967/3%				1967/68% 1968/81%					
Venezuela						1967/27% 1968/33%					
Colombia	1967/24% 1968/25%	1967/20% 1968/6%	1967/100% 1968/100%	1967/95% 1968/80%	1967/59% 1968/65%			1967/63% 1968/61%	1967/61% 1968/67%	1967/49% 1968/53%	
Bolivia	1963/9% 1964/3%										
Central America		1964/25% 1965/16% 1967/35%				1967/66% 1968/65%					
United States		1964/44% 1965/32% 1967/35%				1967/62% 1968/65%					
Europe						1967/45% 1968/38%					
Rest of South America		1964/5% 1965/22% 1967/21%									

Source: D.C.A. Chile Santiago
D.C.A. Colombia Bogota

Rest of South America = (Sao Paulo
(Rio
(Asuncion
(Montevideo

Central America = (Panama
(Mexico City

Europe = Average of major cities in EEC + other Europe.

Table 7.a

Summary of Passenger Traffic Rights Exercised as at February 1969

Selected routes (Excluding Transfer Connections)

From	To	FALAC CARRIERS		NON FALAC CARRIERS	
		Operating 3rd & 4th Freedoms	Operating 5th Freedom	Operating 3rd & 4th Freedoms	Operating 5th Freedom
BUE	BOG	AV.AR.	EP.	-	-
	LPB	LB.AR.	-	-	BN.
	LIM	AR.EP.	AV.LB.LA.	-	BN.CP.
	LON	AR.	-	BR.	RG.
	MIA	AR.	AV.EP.LA.	BN.PA.	-
	NYC	AR.	AV.LA.	PA.BN.	-
	PTY	-	LA.EP	-	BN.PA.
	RIO	AR.	-	SC.	RG.AF.BR.LH.IB.TP.AZ.
	SCL	AR.LA.	AV.EP.	-	RG.IB.SK.BN.LH.AF.BR.
LPB	LIM	LB.	-	-	BN.LH.IB.
	NYC	-	-	-	LH.BN.
	PTY	-	-	-	BN.
	SCL	-	-	-	LH.BN.IB.
SCL	BOG	AV.	EP.	-	IB.AF.LH.
	LPB	-	-	-	IB.LH.BN.
	LIM	LA.EP.	EU.AV.AR.	-	IB.AF.LH.BN.CP.
	LON	-	-	BR.	AF.KL.IB.LH.SR.RG.SK.
	MIA	LA.	EU.AV.EP.AR.	BN.	-
	NYC	LA.	AV.	BN.	LH.
	PTY	LA.	EU.EP.	IP.	BN.
	RIO	-	-	-	RG.BR.SR.LH.IB.AZ.AF.
BOG	LIM	EP.AV.	AR.VA.	-	IB.AF.LH.RG.
	LON	AV.	-	-	AF.IB.
	MIA	AV.OD.	EP.	BN.	RE.
	NYC	AV.	-	BN.	LH.
	PTY	AV.	EP.	-	BN.
	SCL	AV.	EP.	-	IB.AF.LH.
BAQ	MIA	AV.	-	OD.PA.	-
	PTY	-	-	IP.	PA.
GYE	BUE	-	LA.EP.	-	-
	BOG	-	EP.	RE.	LH.
	LPB	-	-	-	BN.LH.
	LIM	EP.EU.	LA.	-	BN.KL.LH.
	MIA	EU.	LA.EP.	PA.BN.RE.	-
	NYC	-	LA.	BN.	LH.
	PTY	EU.	EP.	-	BN.KL.
	SCL	LA.EU.	EP.	-	BN.LH.
RIO	BUE	-	-	-	-
	BOG	AV.	-	RE.	AF.IB.
	LIM	EU.	AV.	-	BN.IB.AF.
	MIA	EU.	AV.	BN.PA.RE.	-
	NYC	-	AV.	-	-
	PTY	EU.	-	-	BN.
	SCL	EU.	-	-	BN.IB.AF.
LIM	MIA	EP.	AR.LA.EU.AV.	BN.PA.	-
	NYC	-	AV.LA.	BN.	LH.
	PTY	EP.	LA.EU.	BN.	KL.
	RIO	EP.	-	RG.	BN.
	SCL	EP.LA.	AR.EU.AV.	-	LH.BN.CP.IB.AF.

SOURCE: ABC Airways Guide

Table 7.b

NATIONAL MARKET SHARES - CARGO TRAFFIC 1975

TO / FROM	Argentina		Bolivia		Chile		Colombia		Canada		Peru		Venezuela		U.S.A.		Europe		C.America	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Argentina	-	-	50	30	50	30	70	50	60	30	50	30	40	20	50	30	40	20	50	30
Bolivia	50	30	-	-	50	30	50	30	50	30	50	30	50	30	50	30	50	30	50	30
Chile	60	50	50	40	-	-	60	50	60	50	50	40	40	30	50	40	40	30	50	40
Colombia	80	70	50	45	70	60	-	-	80	70	60	50	70	60	60	50	50	40	60	50
Canada	50	40	50	40	70	60	80	60	-	-	60	50	50	40	50	40	50	40	60	50
Peru	50	40	50	40	60	50	60	50	60	50	-	-	50	40	50	40	50	40	60	50
Venezuela	40	30	40	30	40	30	40	30	40	30	40	30	-	-	10	10	10	10	10	10
U.S.A.	45	30	45	30	45	30	45	30	45	30	45	30	10	5	-	-	0	0	10	5
Europe	45	30	45	30	45	30	45	30	45	30	45	30	10	10	0	0	-	-	10	10
C.America	45	30	45	30	45	30	45	30	45	30	45	30	10	10	10	10	10	10	-	-

A - Percentage Market Share of FALAC (assuming FALAC established)

B - Percentage Market Share of FALAC Airlines (assuming FALAC not established)

Assumptions for Case A

1. Marketing stronger in home countries (in spite of Avianca)
2. No Far East route
3. FALAC assumed to have no part of Venezuelan traffic north of Caracas
4. Liberal traffic rights situation
5. FALAC supply to attain assumed share

SECTION 8

SPECIMEN 'FALAC' OPERATION OF ALL-CARGO AIRCRAFT

THE FIRST DATE AT WHICH VIABLE AND COMPETITIVE ALL-CARGO OPERATIONS WOULD BE POSSIBLE, LINKING MOST FALAC COUNTRIES TO THE UNITED STATES, IS PROBABLY 1972.

OPERATION OF MODERN ALL-CARGO AIRCRAFT OVER THE SEVEN COUNTRIES BEFORE THIS DATE WILL EITHER LOSE MONEY OR MAKE NO MARKET IMPACT.

A SPECIMEN ROUTE EXCLUDING CARACAS AND LA PAZ BUT INCLUDING PANAMA, MIAMI AND NEW YORK IS POSTULATED AS THE ROUTE MOST LIKELY TO

(A) ACHIEVE SUFFICIENTLY HIGH TRAFFIC DENSITY

AND (B) BE SUFFICIENTLY CONCENTRATED TO PROVIDE HIGH FREQUENCY OPERATIONS WITH A SMALL NUMBER OF UNITS OF EQUIPMENT

(C) CONTRIBUTE TO THE GROWTH IN AIR CARGO OF MOST OF THE PARTICIPANT COUNTRIES.

OPERATION WITH TURBO-PROPS OR TURBO-JET AIRCRAFT ARE FEASIBLE. THE OPTIMAL DECISION ON EQUIPMENT MUST AWAIT THE FINAL DECISION ON PARTICIPATION.

8. Specimen FALAC Operation of All-Cargo Aircraft

8.1 For this trunk route we will now consider a specimen operation of two typical aircraft types. This is not meant to be an aircraft on route evaluation study but is intended to indicate the possibilities open to FALAC for all-cargo operation.

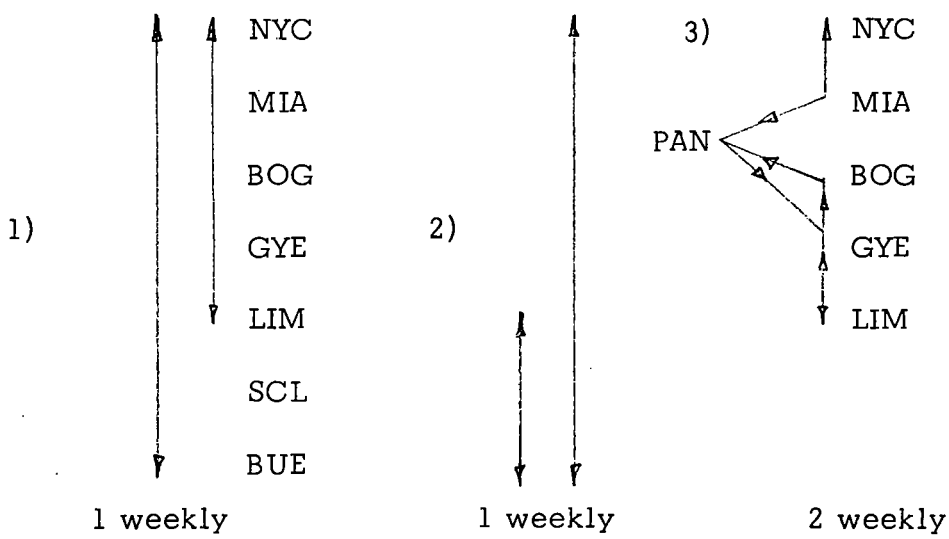
8.2 Route structure and aircraft evaluation must be a distinct exercise. Exclusion of stations or differing sector frequencies have no relevance in this preliminary exercise.

8.3 In order to be competitive, not only now but in 1975, when other lines will have increased their supply, it is clear that a high frequency of service must be maintained. As stated in Section 5, it is clear that all-cargo operations must, initially at any rate, be concentrated on a short route structure of high density traffic.

8.4 We consider two aircraft types typical of the existing range of modern all-cargo aircraft.

8.5 Type 1

A typical 4 engined turbo-prop. We will consider the operation of three aircraft based on Lima. The route pattern of the aircraft could be as shown below:-



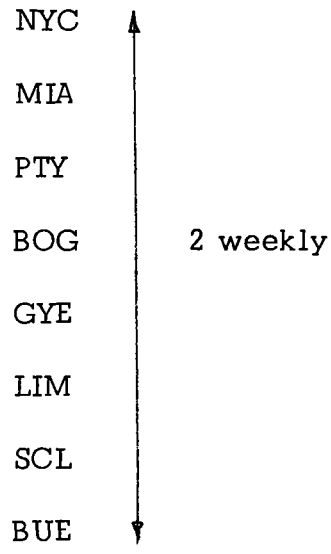
1 weekly 1 weekly 2 weekly

8.6 To operate on this route structure would require daily utilisations of 7.82, 7.33 and 9.45 hrs. for the three aircraft. The resulting sector weekly frequencies would be:-

	South		North
NYC-MIA	5	NYC-MIA	5
MIA-BOG	2	MIA-BOG	3
MIA-PTY	2	MIA-PTY	2
BOG-GYE	3	BOG-PTY	2
PTY-GYE	2	BOG-GYE	5
GYE-LIM	5	GYE-LIM	5
LIM-SCL	3	LIM-SCL	3
SCL-BUE	3	SCL-BUE	3

8.7 Type 2

A typical 4 engined jet. This is a more productive aircraft and we will consider one aircraft based on any convenient station. The route pattern of this aircraft could be as shown below:-



8.8 The resulting weekly sector frequencies would therefore be two in each direction. To operate on this route structure would require daily utilisation of the aircraft, of 7.77 hrs.

8.9 Aircraft Loading

We will assume that, pallet-loaded, on southbound sectors each aircraft will be 60% loaded and northbound, 40%. The resulting payloads for each aircraft type are shown in Table 8a. These loads can be compared to the available sector traffic forecast in Section 3.

8.10 The total productive tonne-kilometres assumed for each operation are thus very similar; 45,338,000 tonne-kilometres for the 3 turbo-props, and 45,733,000 for the single 4 engines turbo-jet.

8.11 We can assume a southbound revenue rate of 17 cents/tonne-kilometre and a northbound rate of 10 cents/tonne-kilometre, these rates being the average earned rates, including commodity and general rates.

8.12 Allowing for the different utilisation rates, the Direct Operating Costs are calculated. The total operating costs are assumed to be those of an all-cargo operation and we will assume that Indirect Operating Costs are 38% of Direct Operating Costs.

8.13 Under broad assumptions, the major costs and revenues are summarised below:-

	3 Turbo-Props $	1 Turbo-Jet $
Capital costs, including Airframe and Engine Spares	11,000,000	8,900,000
Total Annual Revenues	6,419,900	6,499,700
Total Annual Operating Cost		

8.14 These figures above indicate the likely operating costs of the minimum air cargo operation covering most of the FALAC countries and including both Buenos Aires and New York. In fact the operation with a single turbo-jet aircraft is commercially hazardous.

8.15 The level of sector cargo traffic required for this operation indicate that 1972 or 1973 is the minimum date at which it would be feasible.

AIRCRAFT LOADS

TYPICAL 4 ENGINED TURBO-PROP (THREE AIRCRAFT)

	SECTOR	DISTANCE Km	TONNES ANNUAL PAYLOAD (40%) FOR AIRCRAFT 1	2	3	TOTAL Tonnes	TOTAL Tonne-km '000
NORTH	MIA-NYC	1,757	860	430	860	2,150	3,777
	BOG-MIA	2,434	860	430		1,290	3,139
	GUY-BOG	995	860	430	860	2,150	2,139
	LIM-GUY	1,136	860	430	860	2,150	2,442
	SCL-LIM	2,476	430	860		1,290	3,194
	BUE-SCL	1,129	430	860		1,290	1,456
	BOG-PTY	756			860	860	650
	PTY-MIA	1,860			860	860	1,599
							18,399

	SECTOR	DISTANCE Km	TONNES ANNUAL PAYLOAD (60%) FOR AIRCRAFT 1	2	3	TOTAL Tonnes	TOTAL Tonne-km '000
SOUTH	NYC-MIA	1,757	1,757	645	1,289	3,223	5,662
	MIA-BOG	2,434	1,289	645		1,934	4,707
	BOG-GUY	995	1,289	645		1,934	1,924
	GUY-LIM	1,136	1,289	645	1,289	3,223	3,661
	LIM-SCL	2,476	645	1,289		1,934	4,786
	SCL-BUE	1,129	645	1,289		1,934	2,183
	MIA-PTY	1,860			1,289	1,289	2,397
	PTY-GUY	1,252			1,289	1,289	1,613
							26,939

TYPICAL 4 ENGINED JET (ONE AIRCRAFT)

	SECTOR	DISTANCE	TONNES ANNUAL PAYLOAD (40%)	TONNE-Km '000
NORTH	MIA-NYC	1,757	1,810	3,180
	PTY-MIA	1,860	1,810	3,366
	BOG-PTY	756	1,810	1,368
	GUY-BOG	995	1,810	1,801
	LIM-GUY	1,136	1,810	2,056
	SCL-LIM	2,476	1,810	4,481
	BUE-LIM	1,129	1,810	2,043
				18,297 TOTAL

	SECTOR	DISTANCE	TONNES ANNUAL PAYLOAD (60%)	TONNE-Km '000
SOUTH	NYC-MIA	1,757	2,714	4,768
	MIA-PTY	1,860	2,714	5,048
	PTY-BOG	756	2,714	2,051
	BOG-GUY	995	2,174	2,700
	GUY-LIM	1,136	2,174	3,083
	LIM-SCL	2,476	2,174	6,719
	SCL-BUE	1,129	2,714	3,064
				27,425 TOTAL

SECTION 9

THE FINANCIAL BENEFITS OF INTEGRATION FOR INDIVIDUAL AIRLINES

ASSUMING THAT INDIVIDUAL AIRLINES DO NOT CO-OPERATE IN FALAC, IT IS PROBABLE THAT THEY WILL PURCHASE THEIR OWN ALL-CARGO AIRCRAFT IN THE NEXT FEW YEARS. IF THEY DO NOT DO SO THEY WILL LOSE THEIR MARKET SHARE.

INTEGRATION IN A COMMON FALAC ORGANISATION CAN BE COMPARED WITH INDEPENDENT OPERATION. FOR THE SEVEN AIRLINES TOGETHER, THE NET PRESENT VALUE BENEFIT OF INTEGRATION IN FALAC IS $84,815,000 FOR THE TEN YEARS FROM 1973.

9. The Financial Benefits of Integration for Individual Airlines

9.1 We can presume that each individual airline will separately assess the benefits of co-operation in this joint enterprise. Factors other than direct financial will influence their attitudes towards it. Political constraints will certainly be important. However, the basic framework of such an assessment is provided by an analysis of the financial benefits. Rather than consider all seven airlines separately we will indicate the benefits for the AVERAGE FALAC AIRLINE.

9.2 This AVERAGE FALAC AIRLINE carries both passenger and freight traffic internationally and domestically. International freight traffic is presently 5.9 million tonne-kilometres, with 1.1 million tonne-kilometres of mail. Nearly all this traffic is carried belly-hold on modern passenger aircraft, together with an extremely small piston-engined all-freight operation carrying some international freight on a very restricted route.

9.3 With international cargo traffic presently expanding rapidly, faster than passenger traffic, the average airline is seeking to expand its cargo capacity by purchase of all-cargo equipment. However such equipment will increase the average direct cost of cargo operations. Minimisation of this increased direct cost is provided by the larger, more productive equipment, but this equipment demands larger volumes of traffic than are possible in the near future. On the other hand, non-purchase of this equipment will inevitably involve an erosion of the market share. Since cargo operations (domestic as well as international) are now 19% of the airlines revenue, and growing, the airline will be reluctant to lose its market position in this area.

9.4 We can examine two hypothetical possibilities for this average airline.

1. Independant operation together with purchase of its own all-cargo equipment.

2. Co-operation in a FALAC operation, an Integrated Air Cargo System.

9.5 In considering an Integrated Air Cargo System we will presume that the system operates as described in Section 6; that all cargo traffic, belly-hold and all-freight, is the concern of FALAC; that individual airlines will be free to pursue domestic cargo operations, and international passenger operations, but will lease to FALAC all the belly-hold space that each airline considers appropriate for cargo traffic, after considering its own passenger needs.

9.6 Although we can assume effectively zero direct costs for cargo operations in passenger aircraft, indirect costs including sales and administration as well as handling probably average 4 cents/tonne kilometre.

9.7 We can assume that the integrated FALAC operation will take responsibility for handling cargo on all the international stations. Hence all handling costswill be the responsibility of FALAC. As part of the setting-up operation, cargo handling equipment and facilities on all foreign stations and those in excess of domestic requirements on the home international airports would be transferred to FALAC.

9.8 Cargo sales and marketing will also be the responsibility of FALAC which will purchase services at its own discretion from the stations of the individual carriers (including non-operational stations).

9.9 Hence for the typical average carrier, indirect cargo cost will be limited to those arising from domestic operations.

9.10 We are assuming at this stage, and for the sake of simplicity, that mail will continue to be carried by the individual carriers. This might be amended.

9.11 Case 1 - The Average Airline Operating Independently

At least three of the airlines are actively considering the purchase of modern all-freight aircraft. For at least five of the airlines such a move is a real possibility. Clearly all should not purchase such equipment and use them on international routes - there is not sufficient market for them all to operate economically on largely competing routes. However, those airlines that have not access to modern all-freight equipment will certainly lose their market position and share.

9.12 Ignoring the tactical aspect of this situation, we will assume that the average airline will purchase a single unit of the smallest capacity all-cargo aircraft in 1973. At this point in time there will be excessive all-cargo capacity for the international routes. To some degree this excessive capacity will be utilised on domestic routes (we are still considering the average carrier) but only limited market gains can be made and new cargo generated on domestic and international routes. We can expect operating losses to be generally incurred in such a situation, and the sustainable frequencies of the single aircraft on international operation to make little market impact.

9.13 Case 2 - Falac Operation

We will assume that in the case of FALAC integration, co-operative services will commence at the start of 1971 and that immediately increased market penetration will occur from that date. The all-freight operation will, in addition, begin in 1973, on a route similar to the outlined Specimen Route. The assumption will be that, from 1973, full achievable market penetration will be realised and that through cargo rights to New York will have been achieved for FALAC.

9.14 The cargo traffic projections of the average airline under these two assumptions are shown in Figure 9a.

9.15 We will assume that the direct costs incurred by FALAC will include the costs of leasing capacity from the individual airlines and then, from 1973, its own direct operating costs for all-freight aircraft.

9.16 Indirect costs of FALAC will fall from 1971 on assumed scale economies and fall slightly further, per unit performed, when a major percentage of the traffic becomes palletised following the start of all-freight operations.

9.17 We will assume that the airlines will incur effectively negligible direct costs from the carrying of freight and no opportunity cost in lost passenger revenue, as the leasings of capacity are subject to the airlines own assessment of its passenger requirements.

9.18 Revenue will derive from leasing of capacity with two levels of tariff (themselves subject to negotiation); one rate for long-term contracted capacity and one for short-term or standby capacity (perhaps on a six hour basis).

9.19 Essential indirect costs to the individual airline will be concerned with the monitoring of capacity, its leasing and logging. Other indirect costs might arise as a result of FALAC using the airlines as the most efficient mechanisms for some marketing etc. It is assumed that these latter will be purchased at cost by FALAC.

9.20 The financial implications of the two situations are now examined:-

9.21 1. The Average Airline Operating Independently

Figure 9a indicates the likely profile of cargo demand and capacity supply for the average airline. Up to 1973 the difference between demand and capacity in passenger aircraft will be met from continuing use of high cost, piston engined, all-cargo aircraft.

As stated in 9.11, it is assumed that in 1973, the average airline will buy a single unit of all-cargo capacity - here assumed to be a turbo prop. At this stage the high-cost piston aircraft are disposed of or transferred to domestic operations and 20,400,000 tonne-kilometres of capacity (at 60% load factor and 3,000 hours utilisation) are available to carry the 5,500,000 tonne-kilometres of demand. A further purchase becomes necessary in 1980.

9.22 Figure 9a indicates that a maximum requirement of 5,500,000 tonne-kilometres are available for an all-cargo operation in 1973 for the average airline - this is assuming that when capacity is available, freight will be preferentially shipped on passenger aircraft incurring zero direct cost.

9.23 Revenue

It is assumed that revenues will be derived from a basic rate of 15 cents/tonne-kilometre up to 1973 and thereafter will fall to 14 cents/tonne-kilometre as all-cargo aircraft achieve larger carryings of low-tariff consolidated traffic.

9.24 Direct Costs

It is assumed that the direct costs of cargo operations on passenger aircraft are zero. The direct operating cost of an all-cargo aircraft will be based on full -3,000 house per year - utilisation. It is reasonable to consider that the aircraft will be operated to nominal capacity in order to penetrate the market.

The direct operating costs of piston-engined all-cargo aircraft are assumed to be 10 cents/tonne-kilometre.

The direct operating costs include capital provision.

9.25 Indirect Operating Costs

It is assumed that the indirect operating costs of cargo carryings in passenger aircraft are 4 cents/tonne-kilometre, and that the same figure will apply to all-cargo aircraft operating at this scale. Above 100,000,000 tonne-kilometres, it is assumed that indirect costs will fall to 3 cents/tonne-kilometre and above 200,000,000, 2 cents/tonne-kilometre.

9.26 FALAC Operation

The equivalent profile of cargo demand and capacity supply for the FALAC operation is shown in figure 9b.

The growing traffic receives a boost in 1971 when joint operations start. In 1973 existing piston-engined all-cargo aircraft are disposed of, a four engined turbo jet freighter is purchased, and 58,500,000 tonne-kilometres of capacity are available for 50,000,000 tonne-kilometres of demand. The profile of purchases continues with three turbo props in the next three years and a further turbo jet in 1978 - See Table 9.a.

9.27 The cash flows of the two operations are displayed in Tables 9.b and 9.c For the individual average airline acting independently, the cash flows are shown in Table 9.b. Up to 1972 the direct costs are those of operating obsolete equipment, and combined with high indirect operating costs, the net receipts are only half the revenues - $1,138,000 and $2,070,000 respectively.

In the FALAC operation the assumptions are that 80% of the FALAC net receipts are distributed to the participants as leasing costs and 20% are retained for capital planning, and ultimately profit distribution to the participants.

9.28 Comparison

The comparative worth of the two operations can be judged by examination of the present value of the net cash flow in each case. Because the direct costs of the piston-engined all-cargo aircraft are probably underestimated, the present value is probably best judged from 1973. The discount rate chosen is 10%.

9.29 The net present value at 1973 of cash flows from 1973 to 1983 to the individual average airline is $13,649,000 under case 1.

In the case of co-operation in the FALAC enterprise, case 2, the net present value over the same period is $20,615,000.

Also in the case of FALAC co-operation, a net present value to the FALAC organisation of $36,115,000 is indicated.

9.30 For the average airline the net present value benefit of integration is $6,966,000 for the ten years from 1973.

For the seven airlines together the net present value of integration in FALAC is $84,815,000 for the ten years from 1973.

9.31 Clearly the benefits of co-operation will be different for each of the airlines. However all will benefit and the distributed leasing revenues will reflect opportunity costs on mixed aircraft operations. There is every incentive for a participant to remain in the FALAC organisation, once formed, since the benefits will be continuous and an individual airline on leaving will have the same problems of small-scale operation facing large scale competition.

9.32 It is presumed that each of the airlines will assess the benefit of co-operation in terms of its own scale of international cargo operations and its likely policy of purchase of new equipment.

Although the resulting detail will be different for each airline - for example, Apsa presently has no all-freight operations - the same overall picture will apply.

9.33 Attempts to purchase all-freight aircraft before 1973 will result in the average airline incurring greater costs. A hoped-for result of such a tactical move might be to so dominate the air cargo field as to dissuade other carriers from competing by similar purchases of all-cargo equipment. This must be judged an unlikely result.

Excess Cargo Demand and All Cargo Aircraft Purchased

(1) Average FALAC Airline Operating Independently

	Excess Cargo Demand (Tn - Km '000)	Assumed Purchases All Cargo Aircraft	Modern All Cargo Capacity (Tn - Km '000)	Direct Operating Cost ($ U.S.)
1970	2,000	-	-	-
1971	3,000	-	-	-
1972	4,000	-	-	-
1973	5,000	1 turboprop	20,400	1,292,000
1974	6,250	-	20,400	1,292,000
1975	8,250	-	20,400	1,292,000
1976	10,000	-	20,400	1,292,000
1977	12,000	-	20,400	1,292,000
1978	15,000	-	20,400	1,292,000
1979	18,000	-	20,400	1,292,000
1980	23,000	1 turboprop	40,800	2,584,000
1981	27,000	-	40,800	2,584,000
1982	33,000	-	40,800	2,584,000
1983	38,000	-	40,800	2,584,000

(2) FALAC Operation

1970	13,000	-	-	-
1971	20,000	-	-	-
1972	30,000	-	-	-
1973	50,000	1 turbojet	58,000	2,620,000
1974	60,000	1 turboprop	78,400	3,912,000
1975	80,000	1 turboprop	98,800	5,204,000
1976	100,000	1 turboprop	119,200	6,496,000
1977	120,000	-	119,200	6,496,000
1978	150,000	1 turbojet	177,200	9,116,000
1979	180,000	-	177,200	9,116,000
1980	230,000	1 turbojet	235,200	11,736,000
1981	270,000	1 turbojet	293,200	14,356,000
1982	320,000	-	293,200	14,356,000
1983	390,000	2 turbojets	409,200	19,596,000

Table 9.a

(1) Average FALAC Airline Operating Independently

Year	Cargo Tns - Kms (000)	Revenues 000 $	Direct Costs $	Indirect Costs Including Mixed Aircraft $	Net Cash Flow $
1969	8,700	1,220,000	140,000	348,000	732,000
1970	10.200	1,530,000	200,000	408,000	922,000
1971	11,800	1,770,000	280,000	472,000	1,028,000
1972	13,800	2,070,000	380,000	552,000	1,138,000
1973	17,000	2,380,000	1,292,000	681,000	408,000
1974	19,500	2,730,000	1,292,000	781,000	657,000
1975	23,000	3,220,000	1,292,000	920,000	1,008,000
1976	26,500	3,710,000	1,292,000	1,060,000	1,358,000
1977	30,500	4,270,000	1,292,000	1,220,000	1,758,000
1978	35,500	4,970,000	1,292,000	1,421,000	2,257,000
1979	41,000	5,730,000	1,292,000	1,640,000	2,798,000
1980	48,000	6,620,000	1,292,000	1,920,000	3,408,000
1981	55,000	7,700,000	2,584,000	2,200,000	2,916,000
1982	64,000	8,950,000	2,584,000	2,560,000	3,806,000
1983	75,000	10,500,000	2,584,000	3,000,000	4,916,000

Net Present Value from 1973 $ 13,649,000

Table 9.b

(2) FALAC Operation

rage Airline						FALAC						
r	Cargo Tn- Kms	Revenue from Leasing $	Revenue from Services Purchased by FALAC $	Indirect Costs $	Net Cash Flow $	Year	Cargo Tn- Kms ('000)	Revenue $	Direct Costs All Cargo $	Direct Costs Leased Capacity $	Indirect Costs $	Net Cash Flow $
1	0	827,000	60,000	60,000	827,000	1971	84,000	12,600,000	2,000,000	5,790,000	3,360,000	1,448,000
2	0	917,000	73,000	73,000	917,000	1972	102,000	15,300,000	3,200,000	6,420,000	4,080,000	1,603,000
3	0	1,330,000	92,000	92,000	1,330,000	1973	129,000	18,100,000	2,620,000	9,300,000	3,870,000	2,320,000
4	0	1,435,000	107,000	107,000	1,435,000	1974	150,000	21,000,000	3,912,000	10,040,000	4,500,000	2,550,000
5	0	1,635,000	126,500	126,500	1,635,000	1975	177,000	24,800,000	5,204,000	11,436,000	5,310,000	2,850,000
6	0	2,140,000	148,500	148,500	2,140,000	1976	209,000	29,300,000	6,496,000	15,000,000	4,180,000	3,730,000
7	0	2,660,000	176,500	176,500	2,660,000	1977	247,000	34,600,000	6,496,000	18,600,000	4,940,000	4,660,000
8	0	2,920,000	207,000	207,000	2,920,000	1978	290,000	40,700,000	9,116,000	20,500,000	5,800,000	5,150,000
9	0	3,400,000	243,000	243,000	3,400,000	1979	340,000	45,700,000	9,116,000	23,800,000	6,800,000	5,960,000
0	0	4,160,000	286,000	286,000	4,160,000	1980	400,000	56,100,000	11,736,000	29,100,000	8,000,000	7,270,000
1	0	4,830,000	336,000	336,000	4,830,000	1981	470,000	66,000,000	14,356,000	33,800,000	9,400,000	8,450,000
2	0	5,920,000	393,000	393,000	5,920,000	1982	550,000	77,100,000	14,356,000	41,400,000	11,000,000	10,350,000
3	0	6,700,000	465,000	465,000	6,700,000	1983	650,000	91,200,000	19,596,000	46,900,000	13,000,000	11,720,000

Net Present Value from 1973 $ 20,615,000

Net Present Value from 1973 $ 36,115,000

Table 9.c

CARGO DEMAND, CAPACITY IN PASSENGER AIRCRAFT, AND ALL-FREIGHT AIRCRAFT CAPACITY

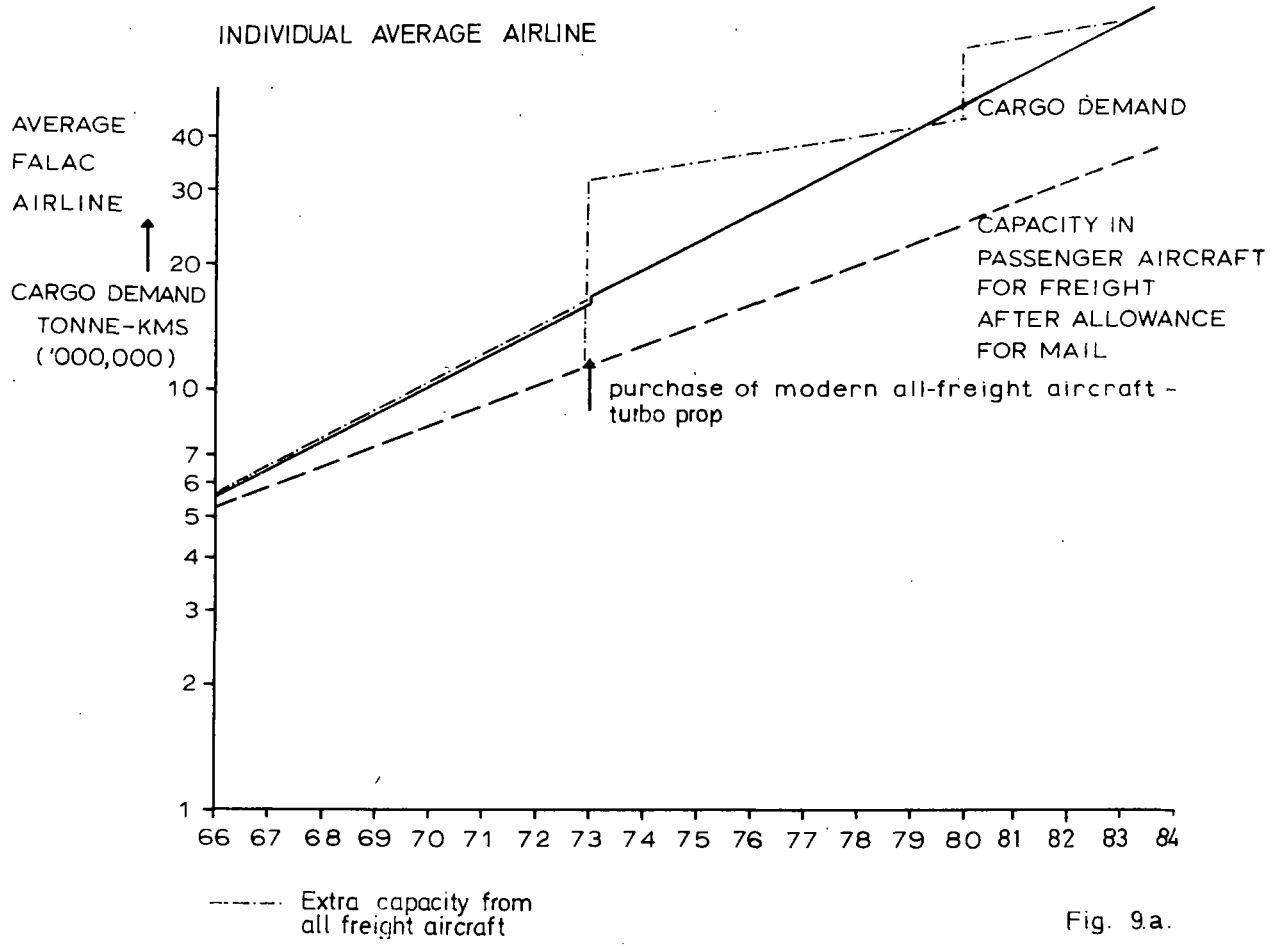


Fig. 9.a.

CARGO DEMAND, CAPACITY IN PASSENGER AIRCRAFT, AND ALL-FREIGHT AIRCRAFT CAPACITY

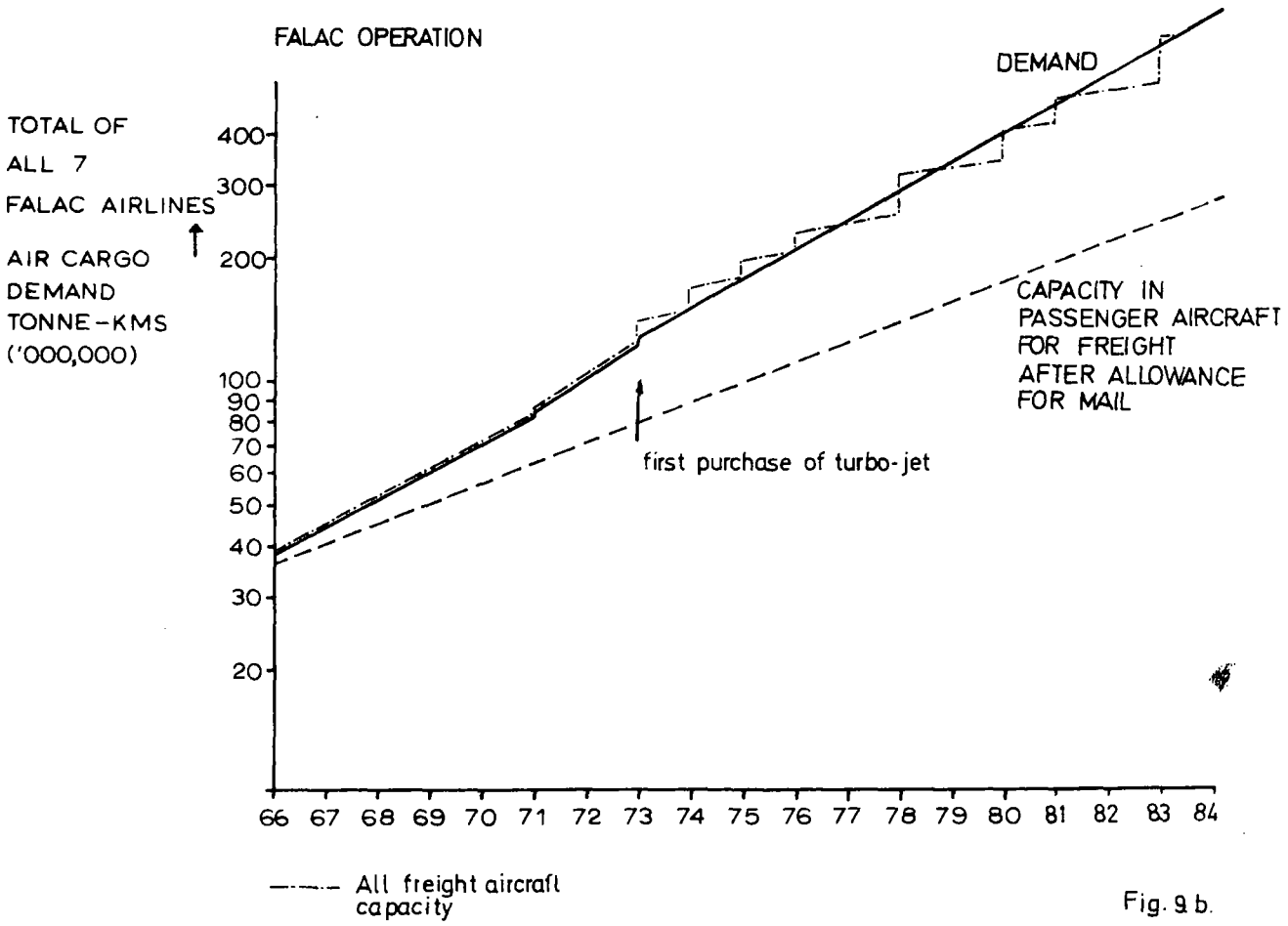


Fig. 9 b.

APPENDICES

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APPENDIX A.1 - CHARTERS

A.1.1 As mentioned in Section 2, considerable difficulty was experienced in obtaining reliable traffic statistics for some countries and/or airlines, even for scheduled services. This difficulty was even greater in the case of charter flights and other non-scheduled movements. Moreover, a number of the freight carriers operating throughout the continent typically run semi-scheduled services, whereby flights are therefore only undertaken when the load justifies.

A.1.2 There are therefore problems of definition about whether to include such flights under scheduled services or not. These smaller airlines often offer very low charter rates, and such operations account for a substantial proportion of the total movements of air freight around Latin America at the present time. An increasing number of these operators are, however, facing a very uncertain financial future, as the costs of their obsolescent fleets steadily rise, and increasing competition becomes likely from major carriers over the mlst profitable routes. The steady decline in the number of operators in the continent seems likely to continue.

A.1.3 Some general indications of charter traffic can be inferred from ICAO statistics of non-scheduled operations. It is, of course, not possible to tell from the ICAO reports what proportion of non-scheduled operations were all-cargo charters, or what traffic they carried. A reasonable estimate of the latter might be obtained by imputing a 60% load factor, but the tonne kilometres thus obtained would include passenger-tonne-kilometres. The figures do, however, clearly indicate the relative importance to the given FALAC carriers of non-scheduled operations, which particularly for Lloyd Aereo Boliviana has been substantial.

Capacity on non-scheduled Flights

Total Available Tonne-Kilometres, '000

Carrier	Year	Scheduled	Non-Scheduled
Aerolineas Argentinas	1964	135,670	261
	1965	138,139	388
	1966	149,464	476
LAB	1963	6,802	3,364
	1965	13,682	4,021
	1966	13,560	3,981
LAN Chile	1963	59,233	2,907
	1966	81,706	4,523
AVIANCA	1964	187,394	2,614
	1965	213,497	3,376
	1966	219,754	13,884

Source: ICAO

A.1.4 Where non-scheduled revenues are available from ICAO sources, they show some striking increases (Avianca 1965 US $257,000; 1967 US $713,000, Viasa 1965 US $18,000; 1967 US $224,000).

A.1.5 Charter flights are sold for the following reasons:-

a) the scheduled service is fully booked

c) no scheduled service is available

d) the shipment cannot be accepted in the aircraft operating the scheduled service (e.g. livestock, large electronic computers)

e) the shipper can obtain a lower rate by chartering than by paying the normal tariff, even after taking advantage of high break-points.

A.1.6 For the purposes of airline planning, clearly the most important consideration is that of competitive rates offered by charter operations. The other reasons are ad hoc or seasonal in nature, since it can be assumed that if regular demand builds up for air freight service over a particular route, a scheduled service will be introduced when the volume of that demand justifies it, provided the airports and other infrastructure are in existence. The available figures on non-scheduled operations clearly show the seasonal nature of most of this traffic.

A.1.7 An analysis was made of charter rates charged by selected FALAC carriers mostly for C-54 equipment. It was found that the rates offered varied from customer to customer, but were in general low compared to the general cargo rate over the same sector for shipments of 500 kgs. or more. However, if it is assumed that in a typical case the aircraft will fly emply one way and full the other, the charter rates per tonne-kilometre begin to approach the IATA general rate. Specific IATA commodity rates were, in some cases, below the equivalent charter rate at a 50% load factor. One FALAC carrier at least has been faced by serious competition in the charter market by independent operators offering charter rates which in some cases must have been below short-run marginal costs. Clearly such a competitor cannot survive on this basis, and a more rationalised charter industry is to be expected in future. Clearly, an operation that only covers short-run marginal costs is of no commercial interest to an operator except insofar as it may contribute to the development of his total market.

A.1.8 Detailed market studies for a FALAC type operation will have to take into account the likely demand for charter capacity over particular routes. However, because of its seasonal and ad hoc nature, it is extremely doubtful whether the charter market will have any bearing on fleet decisions with the possible exception of regular Government charters for the operation of non-commercial social services. Such Government charters, and similar arrangements with oil companies or construction companies, could provide substantial revenues for FALAC, but by their very nature they cannot be forecast except in the most general terms. What is needed is a study of the transportation needs of each development project, during every stage, and close liaison between FALAC and planning offices of Governments and companies.

A.1.9 The main function of FALAC is as a trunk-line freight carrier able to compete on equal terms with major foreign carriers, to whom the charter market is of minor importance. Of much more significance is the likely development of contract shipping, whereby major shippers are guaranteed space under conditions to be negotiated. It can be expected that in many parts of the world, contract shipping arrangements will transform the structure of the air freight industry. In effect, airlines will increasingly become wholesalers of capacity, leaving the retail side of the business increasingly to consolidators. Contract shipping offers many of the advantages of chartering, and will tend to allow a more efficient use of fleets.

A.1.10 With the proviso that the charter market needs further and continuous study, it can be said that FALAC should base its decisions on fleet and routes on the basis of regular scheduled operations offering the possibility of high fleet utilisation at acceptable load factors. Additional revenue arising from charter flights should obviously be sought where appropriate, but spare capacity should not be held for this purpose alone. For very heavy seasonal peaks, as might for example be caused by the winter blocking of a road, wet-leasing arrangements could enable FALAC to carry the traffic without over-investment in its own equipment.

APPENDIX A.2 - CARGO CAPACITY ON PASSENGER AIRCRAFT

A.2.1 Passenger services will continue to provide a significant part of total cargo capacity for the foreseeable future.

A.2.2 A questionnaire sent to each of the FALAC airlines indicated that no precise picture could be obtained of the likely composition of each carrier's passenger fleet in 1975. Since, however, the broad commercial policy of each airline was established where possible by discussions with airline managements and since the number of suitable aircraft for each type of operation is very limited, it was possible to arrive at the most likely kind of fleet for each carrier.

A.2.3 The broad assumption was made that passenger load factors would remain roughly at their present level, around 50% overall, although load factors of 60% and 70% were also included in the calculation. The volume of passenger baggage for each load factor was calculated on an assumed density of 5lb per cubic foot, for a mixed configuration of 86% tourist class and 14% first class. The remaining belly-hold volume after allowance for passenger baggage was then converted into equivalent weights of cargo at three different assumed densities; 6, 7.5 and 9lb per cubic foot.

A.2.4 The results shown in Table A.2a. are theoretical, and do not take into account operating conditions over any particular route. In other words, it is assumed that there are no payload restrictions, which though valid for most routes within Latin America, would need modifying for long overwater routes such as the South Atlantic.

A.2.5 The range with capacity payload of representative aircraft can be compared with the average stage length of the FALAC routes:-

Aircraft	Range (still air) with capacity payload Km.	
Boeing 747	8,430	
Douglas DC-8-63	7,616	
Boeing 707-320B	6,948	(Source = ICAO July, 1968)
Douglas DC-8-50	10,849	
Convair 990A	6,115	
Boeing 727-100	3,300	

Average FALAC stage length 1,041 kms.

A.2.6 At a passenger load factor of 50%, the 6 aircraft types selected could carry between 867 and 7,613 kilos of cargo, based purely on volumetric considerations.

Aircraft Types	Theoretical weight of cargo and mail that could be carried assuming a passenger load factor of 50%	
	at a density of 6 lb/cu.ft. Kg	at a density of 9 lb/cu.ft. Kg
Boeing 747 (passenger version)	5,075	7,613
Douglas DC-8-63	3,399	5,099
Boeing 707-320B	2,629	3,943
Douglas DC-8-50	1,570	2,355
Convair 990A	1,088	1,632
Boeing 727-100	867	1,300

Source - See Table A.2a.

A.2.7 In a calculation of this sort, the result is obviously heavily dependant on what assumptions are made about the likely density of cargo and baggage. ICAO average figures of 247 kg/cu. metre and 195 kg/cu. metre for cargo and baggage respectively (Review of the Economic Situation of Air Transport, June 1965) give very much higher theoretical capacities of cargo and mail, for example, for the Boeing 747 at 50% passenger load factor, 20,773 kg as against 7,613 kg at 9 lb/cu.ft.

A.2.8 It was not possible, from available FALAC airline statistics, to establish the levels of cargo densities over particular routes. There may be substantial directional differences - with relatively dense shipments tending to predominate in the southbound routes. It can be expected that any consistent tendency for potential revenue to be lost through volume or weight limitations will be compensated for by a change in the structure of freight rates.

A.2.9 Possible Changes in Baggage Allowance

It can be expected that baggage allowances based on volume rather than weight will become more widespread, following the U.S. domestic system. Assuming each passenger is allowed 3 bags, the width plus length plus width of each, not exceeding 62" for the first, 55" for the second, and 45" for the third, the likely volume of baggage in luggage of standard dimensions would be around 9.4 cu. ft. At a density of 5 lb per cu. ft., this is equivalent to a free baggage allowance of 47 lb. A mixed configuration of 86% tourist class passengers with 44 lb baggage and 14% first class passengers with 66 lb baggage would have an average of 47.14 lb each. The weight difference caused by the new system, on the assumptions given, would therefore be negliable.

A.2.10 The figures of weight of cargo capacity to passenger carried shown in Table A.2a. represent minimum figures. Even 9 lbs/cu.ft. is almost certainly lower than the average density of cargo traffic presently carried by the FALAC airlines. Hence the corresponding average value of cargo capacity per passenger carried for the aircraft types listed (see Table A.2a.), of 32.4 kilos per passenger represents a minimum capacity.

Theoretical Weights of Cargo Acceptable in Freight Holds of Selected Passenger Aircraft - at given Passenger Load Factors and Cargo Densities

Aircraft Type	Passengers at 50% of capacity	Passenger Load Factor at 50%		
		Weight of Cargo Acceptable at given Average Densities		
		96.3 kg/cu.m (6 lb/cu.ft)	120.4 kg/cu.m (7.5 lb/cu.ft)	144.5 kg/cu.m (9 lb/cu.ft)
Boeing 747	200	5,075	6,345	7,613
Douglas DC-8-63	130	3,399	4,250	5,099
Boeing 707-320B	85	2,629	3,287	3,943
Douglas DC-8-50	85	1,570	1,963	2,355
Convair 990A	55	1,088	1,361	1,632
Boeing 727-100	60	867	1,084	1,300

Ratio of Weight of Cargo Acceptable per Passenger Carried

Aircraft Type		Assuming Densities of Cargo of		
		96.3 kg/cu.m	120.4 kg/cu.m	144.45 kg/cu.m
Boeing 747	1	25.38	31.73	38.07
Douglas DC-8-63	2	26.15	32.69	39.22
Boeing 707-320B	3	30.93	38.67	46.39
Douglas DC-8-50	4	18.47	23.09	27.71
Convair 990A	5	19.78	24.75	29.67
Boeing 727-100	6	14.45	18.07	21.67
AVERAGE (2-6)		22.0	27.5	32.4

SOURCE: ICAO "Review of Economic Situation of Air Transport". July 1968

and TABLE A.2b

TABLE A.2a

FREIGHT CAPACITY ON PASSENGER AIRCRAFT

Aircraft Type	Passenger Capacity (1)	Capacity of Freight Holds	Passenger Load Factor - 50%					Passenger Load Factor - 60%					Passenger Load Factor - 70%				
			Estimated volume of Passenger Baggage	Estimated Hold Space Available for Cargo	Weight of Cargo and Mail Acceptable at given average Densities			Estimated volume of Passenger Baggage	Estimated Hold Space Available for Cargo	Weight of Cargo and Mail Acceptable at given average Densities			Estimated Volume of Passenger Baggage	Estimated Hold Space Available for Cargo	Weight of Cargo and Mail Acceptable at given average Densities		
					96.3 kg/cu.m (6lb/cu.ft)	120.4 Kg/cu.m (7.5lb/cu.ft)	144.45 Kg/cu.m (9lb/cu.ft)			96.3 Kg/cu.m	120.4 Kg/cu.m	144.45 Kg/cu.m.			96.3 Kg/cu.m	120.4 Kg/cu.m	144.45 Kg/cu.m
	No	cu.m	(2)	(2)	kg	kg	kg	(2)	(2)	kg	kg	kg	(2)	(2)	kg	kg	kg
Boeing 747	400	106	53.3	52.7	5,075	6,345	7,613	63.9	42.1	4.054	5,068	6,081	74.6	31.4	3,024	3,781	4,536
Douglas DC-8-63	259	70	34.7	35.3	3,399	4,250	5,099	41.6	28.4	2,735	3,419	4,102	48.6	21.4	2,061	2,577	3,091
Boeing 707-320B	179	50	22.7	27.3	2,629	3,287	3,943	27.2	22.8	2,196	2,745	3,293	31.8	18.2	1,753	2,191	2,629
Douglas DC-8-50	170	39	22.7	16.3	1,570	1,963	2,355	27.2	11.8	1,136	1,421	1,704	31.8	7.2	693	867	1,040
Convair	113	25	14.7	11.3	1,088	1,361	1,632	17.6	8.4	809	1,011	1,213	20.6	5.4	520	651	780
Boeing 727-100	120	25	16.0	9.0	867	1,084	1,300	19.2	5.8	558	698	838	22.4	2.6	250	313	376

NOTES 1. Capacity variable according to configuration - typical values shown

2. Estimated at 5 lb/cu.ft (80.25 kg per cu.metre), mixed configuration, 20 kg tourist, 30 kg first class

SOURCE - Aircraft data - ICAO "Review of Economic Situation of Air Transport". July 1968

TABLE A.2b

APPENDIX A.3 - TOTAL DISTRIBUTION COST METHODOLOGY

A.3.1 In order to investigate the characteristics of transportation costs on all the major international routes relating to the FALAC countries, a large part of the field-work in each country was devoted to collecting costs in various categories and transportation times.

A.3.2 Two basic approaches were used to collect the required information:-

a) Preceded by prepared questionnaires, interviews were held with major importers and exporters to establish the separate factors of costs contributing to the total distribution cost of transporting a set of named commodities by both air and surface modes (sea and rail where appropriate).

A.3.3. Total distribution cost information was concentrated on a range of nine commodities (largely manufactured goods) common for all countries together with a set of perishable agricultural/horticultural goods and shellfish appropriate for each country i.e. grapes and soft fruit from Chile, etc.

A.3.4 These standardised commodities were:-

Household Goods
Radios
Electrical Machinery
Electrical Spares
Refrigerators
Motor Parts
Textiles
Toilet Goods
Pharmaceuticals

A.3.5 For the nine common manufactured goods, a standardised list specifying the size of shipment, packing etc., was produced and the questionnaire and the information from the individual shipping insurance agents etc., was used in calculating the total distribution cost:-

a) for each of the nine items

b) between the capitals of the FALAC countries and the major world import and export countries

c) by both air and surface transport.

A.3.6 b) In addition, interviews were held with agencies etc., concerned with each cost item in each country, hence Insurance Agents, Shipping Companies, Port and Airport Cargo Handling Authorities. Railway Management, Trucking Companies, Consolidators and Packing Agencies in each country were able to produce information on tariffs and average transhipment times.

A.3.7 Further information on shipping costs and insurance rates was also obtained in London from Conference Offices and Insurance Companies respectively. In this way checks were available on the validity and generality of the actual reported costs.

A.3.8 Customs authorities provided information on import (and export) dues including methods of customs valuation and peculiarities of dues (for example, in Venezuela consular fees are not charged on air imports).

A.3.9 The factors of cost contributing to total distribution cost include shipping, handling, documentation etc., and are shown on a typical questionnaire (see over).

A.3.10 Insurance Agencies (mostly acting on behalf of London companies) produced quotations on insurance of shipments, again standardised by size and packaging, of the nine items by each mode.

Reference Number.....

TRANSPORT & TOURISM TECHNICIANS LTD.

Questionnaire for Establishment of Total Distribution Costs

1. Company _____

2. Address _____

3. Telephone _____

4. Individual Interviewed Name _____ Position in Company _____

5. Interviewed by _____ Date _____ Time _____

USE A SEPARATE SHEET FOR EACH SHIPMENT ANALYSED

Details of Shipment

6. Description (full) _____

_____

7. SITC Code _____ 8. Gross Weight _____ 9. Net Weight _____ kg.

10. Value _____ $ 11. Numbers of Packages in Shipment _____

12. Details of Packing _____

_____

13. First Origin _____

14. Last Destination _____

Method of Transport

15. Route From _____ to _____ by _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

COSTS (Where Estimated, Mark "E")

	$
Packaging Costs	
Transport to Port of Shipment	
Charges at Port of Shipment (Specify) _____	$
_____	
Documentation Charges	
Insurance	
Freight Charges from _____ to _____	
_____ _____	
_____ _____	-
_____ _____	
Total Freight Charges	
Offloading Port to Final Destination	
Unloading Charges	
Handling Charges	
Clearance Charges	
Warehousing Charges	
Transport Costs from Warehouse to Point of Consumption (Specify) _____	
_____	
SUB TOTAL	

Total Time From First Origin to Last Destination

_____ days.

Cost Associated With Time

Basis for Calculation _____

_____

TOTAL COSTS

APPENDIX A.4 - SUMMARISED METHODOLOGY OF AIR CARGO TRADE POTENTIAL

A.4.1 Air Trade Potential

Air trade potential between two countries is a function of two factors:-

1. Overall Potential - The trade between any two countries described by value/weight mix and perishability content.

2. The Air Market Share Potential - The competitive position of air transport/surface transport for that particular route described by the ratio -

$$\frac{\text{Total Distribution Cost Air}}{\text{Total Distribution Cost Surface}}$$

A.4.2 We start with the assumption that the overall pattern of trade between any two countries is exogenous i.e. that major changes in overall trade flows between countries will not result from the immediate changes in development of air cargo trade. Since air trade is still much less than 1% of total trade world-wide, this is a supportable assumption.

A.4.3 Forecasting of trade resulting in inter-country estimates for the years 1975 and 1980 in current U.S. dollars is made in Section 3.2

A.4.4 The composition of this trade is considered historically and after consideration of all factors likely to affect this, i.e. programmes of industrialisation and the resulting substitution effects - a probable mix, particularly in manufactured commodities is estimated, in Section 3.2 for the years 1975 and 1980.

A.4.5 The result of these two forecasts is to produce an overall potential forecast of trade, by value, described within each commodity group, at an equivalent one digit level of description, together with individual forecasts for certain commodities at a two and three digit level.

This is the market open to penetration by air transport.

A.4.6 Present Air Penetration

The degree of penetration of this market by air at the present time relates -

a) to the mix of commodities traded on a route.

b) to the competitive advantage of air on that route to surface transport.

Hence La Paz, Bolivia, inaccessible to direct sea transport has a higher potential for air penetration into trade with the U.S. than Lima.

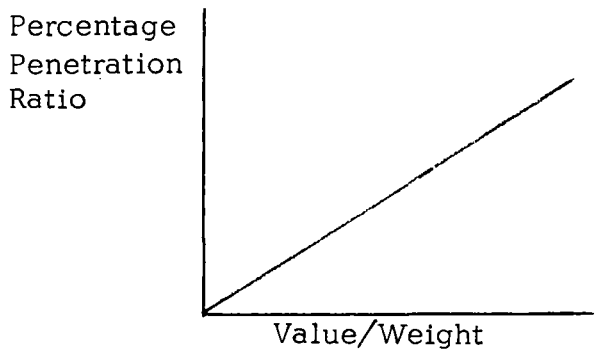
c) to the degree of learning of this advantage by shippers etc. i.e. to their degree of rationality in assessing the competitive advantages of modes in their choice of air or surface transport, and also related to a number of supply

A.4.7 Air Penetration by Commodity Mix

From other studies it is clear that the dominant factors relating air penetration to a wide range of commodities is value/weight ratio.

A.4.8 An extremely detailed investigation was made of the percentage penetration by weight of air into total trade between each of the FALAC countries and the U.S., for each of a range of value/weight ratio categories.

A.4.9 The gradients of the relationship 'Penetration Percentage to value per unit weig was more clearly marked for the route U.S. to Venezuela, by far the most mature origin/destination pair in the FALAC countries in terms of air cargo development.



We can assume that the 'Penetration Percentage/Value/Weight' gradients of other routes will develop over time as the routes mature and shippers become more 'rational', and will eventually assume the form of the U.S. - Venezuela relationship.

A.4.10 However, it is to be expected that the potential limits of these gradients, the potential percentage of air will be different for different routes.

A.4.11 An estimate of how these differing limits of air penetration between routes will vary can be obtained by using total distribution cost ratios.

A.4.12 Air Penetration Potential by Route

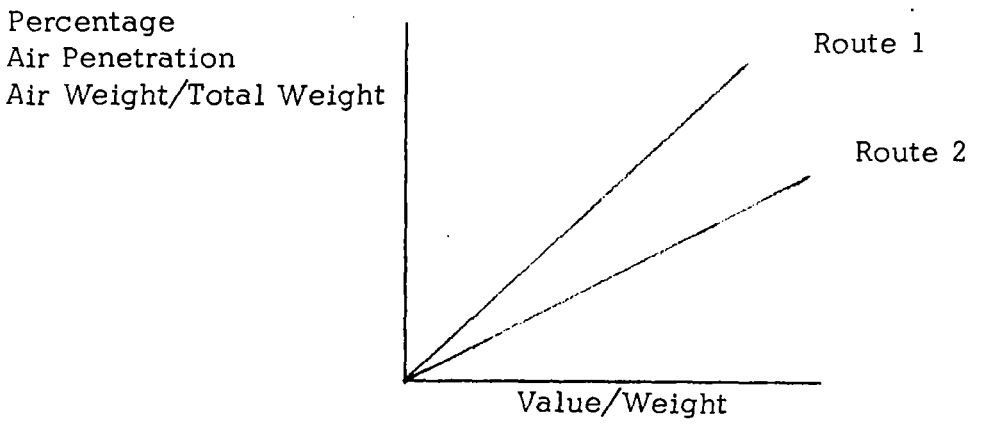
Various measures which might be adopted to describe the relative utility to shippers of air to surface transportation have been proposed. Traditionally the shippers have used the cost difference between modes (air cost - surface cost). Marketing efforts of carriers have urged the comparison of total distribution cost to be the more realistic basis for the mode shipping decision.

A.4.13 Wishing to define a single measure to describe the air market share potential, i.e. the possible penetration potential of air into total trade, we have ignored commodity differences and defined for each trade route a single ratio representing the average -

$$\frac{\text{Total Distribution Cost by Air}}{\text{Total Distribution Cost by Surface}}$$

which we shall call the total distribution cost ratio (TDCR) over a range of nine common commodities. This is described in Appendix A.3.

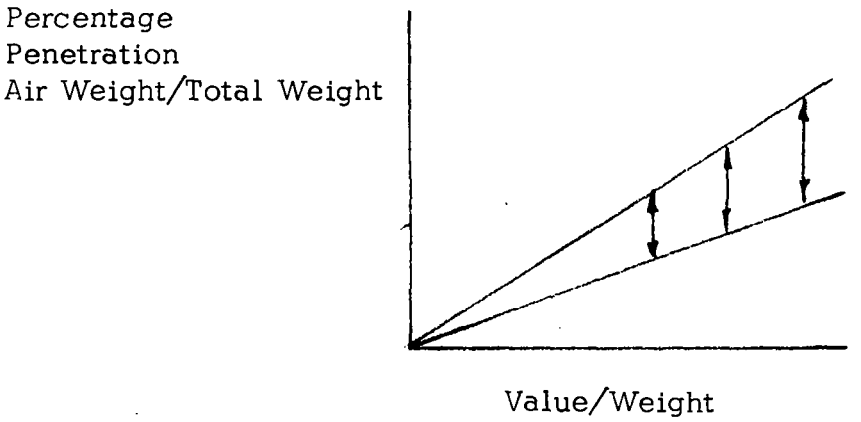
A.4.14 This total distribution cost ratio is used to define the potential limits of the gradients of air penetration for each route:-



Hence if the air penetration for route 1 is greater than that for route 2, TDCR2, the gradient of route 1 will exceed that of route 2.

A.4.15 Potential Air Cargo

The total growth potential of air cargo available can be enumerated by evaluating the growth potential for each value/weight category of trade and multiplying by the total trade in that value/weight category:-



ANNEXES

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Forecast of Total Performed Tonnes-Kilometres
and Tonnes carried (International Scheduled Freight)
For FALAC Airlines based on ICAO growth rates**

Country	Airline	Annual Percentage growth	Tonnes-Km ('000,000) 1966	1975	1980	Freight (Tonnes) 1966	1975	1980
Argentina	Aerolinas	12		14.8	26.2		2,560	4,550
		16	5.25	23	42.6	933	3,540	7,440
		20		27.6	68.7		4,800	11,900
Bolivia	Lab	12		0.75	1.32		565	996
		16	0.27	1.03	2.16	204	775	1,660
		20		1.4	3.48		1,050	2,620
Chile	Lan	12		9.45	16.7		9,470	16,700
		16	3.42	13	27.3	3,420	13,000	27.300
		20		17.7	44		17,600	44,000
Colombia	Avianca	12		40	70.5			
		16	14.42	54.8	115	x	-	-
		20		74.5	185			
Ecuador	Cea	12		2.38	4.2		1,273	2,240
		16	0.86	3.26	6.9	460	1,750	3,670
		20		4.45	11		2,380	5,900
Peru	Apsa	12		10.9	19.2		2,200	3,890
		16	3,93	14.9	31.4	796	2,990	6,360
		20		20.3	50.5		4,120	10.200
Venezuela	Viasa	12		29.2	51.5			
		16	10.56	40	84.4	x	-	-
		20		54.5	136			

* July - Dec = 102. 204 entered for year
x No Figure given
** ICAO report Digest No. 128

ANNEX I

IMPORTS INTO U.S.A.

Shellfish - 1968

('000 lbs)

		January	February	March	April	May	June	July	August	September	October	November	December
Chile	S	141	80	122	168	120	120	191	232	68	125	106	-
	A	-	-	-	-	-	-	-	-	-	-	-	-
Columbia	S	201	216	225	47	381	371	432	308	455	270	214	-
	A	-	1	24	1	10	9	-	-	-	35	15	-
Ecuador	S	536	127	526	601	659	658	713	371	510	502	364	-
	A	-	-	-	-	-	-	-	-	-	-	23	-
Peru	S	35	31	29	18	25	25	54	-	71	32	-	-
	A	-	-	-	-	-	-	-	-	-	-	-	-
Venezuela	S	18	-	-	-	74	72	89	55	151	70	219	-
	A	386	209	495	513	531	531	231	295	264	580	503	-
Guatemala	S	152	99	111	58	153	153	145	130	70	152	82	-
	A	-	-	-	-	-	-	-	-	-	-	3	-
Honduras	S	105	157	106	25	160	160	387	506	517	409	489	-
	A	-	-	-	-	-	-	-	-	-	-	-	-
Nicaragua	S	958	615	337	320	236	236	386	399	385	257	366	-
	A	10	-	-	2	25	24	11	-	-	20	11	-
Costa Rica	S	320	116	315	172	195	194	143	158	149	315	343	-
	A	-	-	-	-	-	-	-	-	6	24	-	-
Panama	S	571	636	669	863	1,172	1,171	1,663	768	1,229	1,000	736	-
	A	51	15	52	-	84	83	107	123	113	144	20	-
Brazil	S	334	277	139	375	451	451	727	348	443	461	654	-
	A	-	-	-	-	-	-	-	-	-	-	-	-
Mexico	S	761	940	473	677	362	362	332	915	783	731	474	-
	A	1	-	-	-	-	-	-	1	2	-	2	-
British Honduras	S	66	-	-	68	82	82	101	40	42	-	141	-
	A	18	-	-	8	-	-	-	19	8	7	15	-

IMPORTS INTO U.S.A.

Fresh Fish - 1968

('000 lbs)

		January	February	March	April	May	June	July	August	September	October	November	December
Argentina	S	736	-	-	496	337	336	625	340	410	431	295	302
	A	-	-	-	-	-	-	-	-	-	-	-	-
Columbia	S	-	-	-	-	-	-	-	-	-	-	-	-
	A	10	23	25	12	20	20	17	32	35	31	18	28
Peru	S	34	2,514	757	3,779	3,593	3,593	69	-	3,284	1,602	-	-
	A	56	50	41	65	55	73	22	5	54	64	38	42
Venezuela	S	-	147	5	-	1	1	-	-	-	-	-	-
	A	62	5	50	2	1	-	1	-	-	-	-	-
Brazil	S	527	287	432	186	378	378	928	497	851	405	600	-
	A	9	16	10	10	8	8	8	14	16	22	18	-
Mexico	S	388	303	256	297	287	287	185	210	332	257	257	276
	A	-	6	12	15	19	19	30	14	12	39	45	24
Equador	S	-	325	1,074	1,304	557	557	2,103	3,441	504	1,373	-	-
	A	-	-	-	-	-	-	-	-	-	-	-	-
Panama	S	-	-	-	315	223	223	-	1,321	676	2	-	-
	A	-	-	-	-	-	-	-	-	-	-	-	-

Grapes - 1968

('000 lbs)

Argentina	S	-	-	48	173	103	148	-	-	-	-	-	-
	A	-	-	149	197	-	-	-	-	-	-	-	-
Chile	S	-	328	1,898	6,924	6,349	6,348	1,411	-	-	-	13	-
	A	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL IMPORTS	S	-	477	3,140	8,936	6,622	6,022	2,011	-	-	-	-	-
	A	1	-	149	197	-	-	-	-	-	-	-	-

KEY S - Surface
A - Air