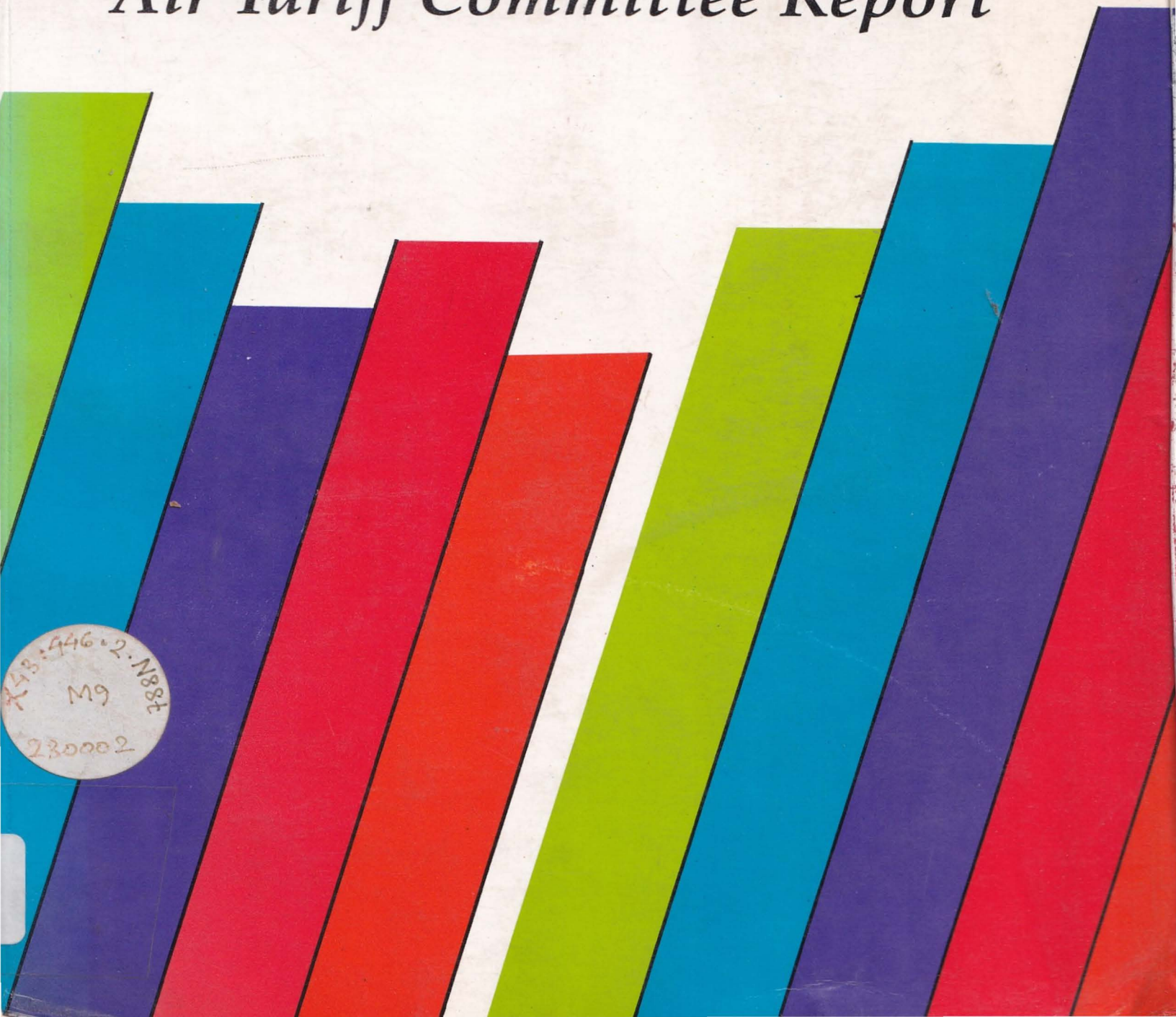


Planning Commission
Government of India
December 1989



Air Tariff Committee Report



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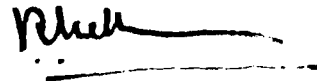
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Preface

The Planning Commission constituted a Committee to make a comprehensive examination of domestic air fares and freight rates and pricing of infrastructure facilities. Besides holding a series of meetings and discussing the issue in all its aspects, the Committee conducted a detailed study of the various items of costs relating to different types of aircrafts which are being operated by Indian Airlines Corporation, and considered the various available alternatives in respect of pricing. In view of the fact that the future operations of IAC would be largely based on the newly acquired A-320 aircraft, the Committee decided to adopt the long run marginal cost of A-320 aircraft as the basis for development of tariff. The proposed tariff structure along with the gist of other recommendations find a place in the executive summary. Apart from developing a rationalised tariff structure, recommendations have also been made, among others about quality of service linked tariffs and provision of infrastructural facilities.

The Committee places on record its deep appreciation to Shri V. Gopalakrishnan, Senior Cost Consultant, BICP, Shri Anil Goyal and Shri S.K. Kundra of IAC who have given invaluable suggestions and put concerted efforts in the making of this report. The Committee is also thankful to other officers and staff of the IAC who have provided the secretarial and other assistance required for facilitating the work of the Committee.



Vijay L. Kelkar
Chairman

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Executive Summary

1. The fare structure of Indian Airlines was fixed by the Air Transport Council (ATC) three decades ago. While, it fulfilled its historical role of giving a direction and thrust to the nascent aviation sector in the country, it is no longer responsive to the vastly changed circumstances and environment. A major limitation is the telescopic profile which does not reflect fully the costs with respect to the length of haul, thereby impinging on the viability of operations and even leading to inter-modal distortions. There is also near absence of flexibility which inhibits the airline to optimise its revenue through an effective and sensitive price mechanism with clear responses to market requirements. The frequent revisions over the years have been largely to compensate increase in input costs with little or no linkage between investment planning and price determination.
2. The Air Transport Council considered only two parameters in developing fare structure — cost of service and value of service. Since then public sector pricing structure has undergone intensive research and studies. There is today a rich body of literature on the subject focusing attention on different parameters such as national objectives, induction of technology, market environment and budget constraint. These approaches could be gainfully integrated for determination of a rational tariff structure.
3. The market segment of Civil Aviation sector largely comprises of passengers who travel on expense account. A recent survey by Indian Airlines shows that 80 per cent of passengers come under this category. Thus, having regard to the nature of services and class of its users, the social or equity considerations are not very relevant except in cases where air transport services have to be provided to link inaccessible areas.

4. Air transport being dependent on import of aircraft and equipment from abroad, and heavy on fuel consumption puts a great strain on the country's foreign exchange resources. Therefore, it is no longer possible to sustain high growth rates in this sector and the Seventh Plan document makes a pointed reference to this aspect. While formulating a tariff structure, due note of such special characteristics has to be taken.
5. The various alternatives in respect of pricing viz. profit maximising prices, average cost prices, fully distributed cost prices, welfare maximising prices, long run marginal cost (LRMC) based prices and second best prices, were considered and it was decided that long run marginal cost based pricing should be preferred for the following reasons:
 - (a) it links investment planning and costing;
 - (b) the resulting fares are based on technically feasible norms and are independent of Indian Airlines' actual costs, making the resultant prices incentive compatible; and
 - (c) the enterprise becomes financially viable as the required capital costs are provided for recovery.
6. The induction of new generation of aircraft by Indian Airlines is in the nature of duplicating greenfield situation of plant and machinery for which the long run marginal cost methodology is most suited, since it reflects current real costs of delivering the service, using the most efficient plant/equipment available.
7. LRMC costs have been worked out for different city pairs assuming an estimated life of 15 years for the aircraft, 2850 block hours of annual utilisation and 70 per cent seat factor, as well as other operational norms for fuel computation, direct aircraft maintenance, etc. The entire projected capital cost of the 31 aircraft has been reckoned for computation of LRMC as the cost of a single green field equipment. While computing the capital related charges, apart from actual interest payable, return on the equity portion has been allowed at 12 per cent post-tax.
8. As regards the two existing fleet viz. AB-300 and B-737, the costs have been estimated taking into account the operational norms for fuel and maintenance costs, 70 per cent seat factor, 2850 block hours of utilisation and depreciation on straight line method, adopting economic life of 15 years and 12 years for AB-300 and B-737 respectively with residual value of 10 per cent. Actual interest

for the borrowed capital and 12 per cent post-tax return on equity including a fair return and booking agency commission have also been taken into account.

9. The Committee has developed a distance slab-wise cost including booking agency commission for the aircraft types A-320, AB-300 and Boeing 737. The Table 1 below and the graph (Fig. 1) indicate the distance slab-wise cost for the these types of aircraft.

Table 1

Comparison of A-320, AB-300 and B-737 costs at 70 per cent seat factor and 2850 block hours of utilisation (at 1989-90 prices) with existing fares (Rs./Passenger km.)						
Distance Slab (kms.)	LRMC		Average	Actual Costs		Tariff As on 19.1989
	PH A-320	BH A-320		AB-300	B-737	
1	2	3	4	5	6	7
1-100	5.820	4.839	5.330	-	3.423	1.88
101-200	3.656	3.160	3.408	-	2.270	1.56
201-300	2.467	2.236	2.352	-	1.627	1.43
301-400	2.012	1.881	1.947	-	1.392	1.21
401-500	1.726	1.663	1.695	-	1.249	1.19
501-600	1.553	1.529	1.541	1.371	1.158	1.13
601-700	1.415	1.419	1.417	1.262	1.072	1.11
701-800	1.320	1.344	1.332	1.200	1.028	1.10
801-900	1.266	1.304	1.285	1.166	1.003	1.09
901-1000	1.204	1.254	1.229	1.114	0.962	1.10
1001-1100	1.159	1.219	1.189	1.084	0.940	1.02
1101-1200	1.118	1.185	1.152	1.054	0.917	1.02
1201-1300	1.086	1.161	1.124	1.028	0.896	1.04
1301-1400	1.076	1.154	1.115	1.027	0.897	1.06
1401-1500	1.068	1.152	1.110	1.029	0.899	1.02
1501-1600	1.020	1.108	1.064	0.974	0.853	1.04
1601-1700	1.012	1.05	1.059	0.981	0.862	0.98
1701-1800	0.986	1.082	1.034	0.949	0.834	0.98
1801 and more	-	0.980	-	-	-	0.98

PH: Plane Hours = Block Hours + Loading and Unloading time

LRMC used is average of column 2 and 3.

10. Indian Airlines is highly dependent on foreign exchange for most of its equipment as well as fuel. The social cost or premium on foreign exchange has never been reflected in the tariffs. It is estimated that if the premium on foreign exchange is incorporated in the computation of costs, then the LRMC per Available Seat Kilometres (ASK) would increase by 6 per cent. However, in recommending the new tariff structure for the airline this premium has not been considered, since this would lead to substantial increase in fares.
11. The relationship between LRMC and actual tariff was studied in order to facilitate the switchover to the new tariff structure in a phased manner. It was found that for existing tariff, the telescopic effect of cost between the shortest and the longest distance slabs was a little above half, while in the case of LRMC, it would be one-sixth. This would imply that an immediate shift to LRMC pricing would result in steep increase in short and medium haul (upto 700 kms) slabs. Therefore, it is recommended that the adoption of LRMC pricing methodology for short haul be gradual, restricting maximum increase to 50 per cent by 1994-95. However, for long haul sectors, the new price framework can be implemented immediately.

It was estimated that for long haul sectors, the resulting fare increase would be in the range of 12 per cent to 20 per cent for distances slab 701-1200 kms. and less than 4 per cent for distances above 1200 kms.

12. In the case of short haul services, a minimum fare of Rs. 250 is recommended by 1994-95 for air distances of 100 kms. or less. As regards the distance slab 100-400 km. the increase in fare recommended will be less than the LRMC rates. This is because the existing rates are far below the LRMC, and a sudden once for all jump in these fares to LRMC levels would result in substantial increase in fares. For the distance slab 101-200 kms, the increase in fare recommended is 40 per cent over the existing fare, as against 118 per cent increase if LRMC rates are observed. Similarly, for the distance slabs 201-300 and 301-400, the increase in fare is recommended at 40 per cent and 49 per cent respectively over the existing fares as against an increase of 60 per cent if rates are increased to LRMC levels. It is only in the case of the distance slab 400-700 kms., that it would be feasible to raise the fares to average LRMC levels by 1994-95. This would imply a range of proposed 28-43 per cent increase in the fares. The proposed increase in passenger fares for 1989-90 and 1994-95 along with the existing fares and the percentage increase in the proposed fares compared with the existing fares are given in Table 2. The proposed fare curve are given in Fig. 2. The fare for any sector can be estimated from the fare curve.

Table 2

Existing and Proposed Passenger Fares at 1989-90 Prices (Rs./passenger km)					
Distance Slab (kms.)	Existing Fare Rs.	Proposed Fares			
		1989-90		1994-95	
		(Rs.)	% increase over (2)	(Rs.)	% increase over (2)
(1)	(2)	(3)	(4)	(5)	(6)
1-100	1.88	Min. 200	-	Min 250	-
101-200	1.56	2.00	28	2.27	46
201-300	1.43	1.79	25	2.07	40
301-400	1.21	1.51	25	1.83	49
401-500	1.19	1.43	20	1.70	43
501-600	1.13	1.36	20	1.54	36
601-700	1.11	1.33	20	1.42	28
701-800	1.10	1.33	20	1.33	20
801-900	1.09	1.29	18	1.29	18
901-1000	1.10	1.23	12	1.23	12
1001-1100	1.02	1.19	17	1.19	17
1101-1200	1.02	1.15	13	1.15	13
1201-1300	1.04	1.12	8	1.12	8
1301-1400	1.06	1.12	6	1.12	6
1401-1500	1.02	1.11	9	1.11	9
1501-1600	1.04	1.06	2	1.06	2
1601-1700	0.98	1.06	8	1.06	8
1701-1800	0.98	1.03	5	1.03	5
1801 and above	-	1.00	-	1.00	-

13. The recommended fare increases are necessary not only to reduce the gaps between LRMC and the existing fare levels in a phased manner, but to also help in demand management, by restricting growth of short haul air traffic, and encouraging it to move by surface modes, which are more suited for this purpose.

14. It is recommended that the 30 per cent mark-up over the economy fares in

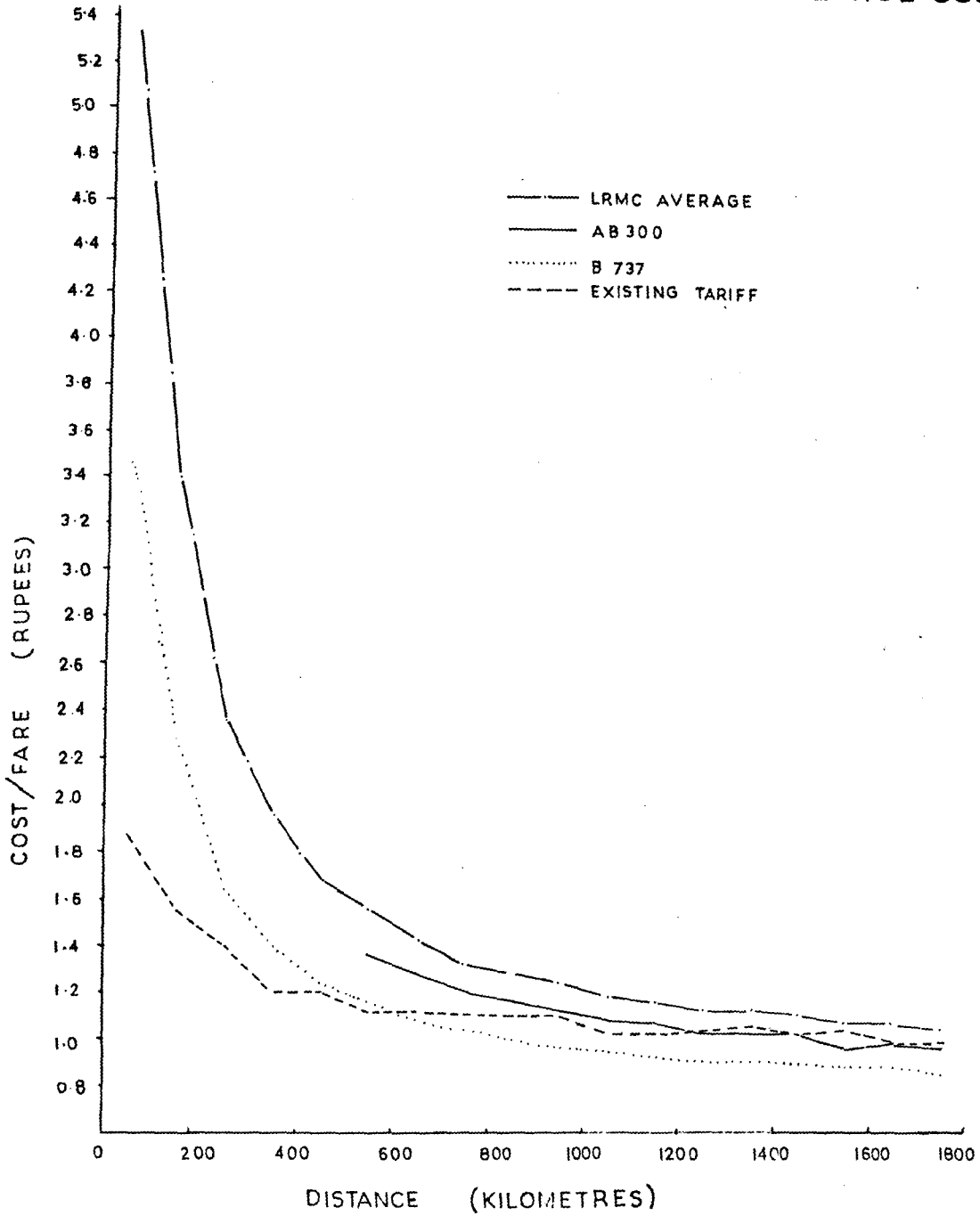
case of executive class may continue in view of the growing demand and value of service provided for this class of users.

15. The airline may be allowed flexibility to vary the LRMC based fares within the range of 20 per cent to 5 per cent of the fare, in view of exceptional operational or commercial reasons which may arise from time to time, provided the increase in fare is ratified by the Government.
16. The various special fares offered by Indian Airlines have been reviewed. It is recommended that as a matter of principle, special fares should be introduced by the Corporation only for commercial and marketing purposes, and if any concessions are to be extended to particular sections of society on non-commercial considerations such as Army concessions, it should be done with an express directive from the Government.
17. As regards freight rates, since non-passenger revenue of the airlines has been treated as a by-product realisation, it has not been considered desirable to apportion costs to carriage of cargo. It has, therefore, been recommended that cargo tariff may be based entirely on marketing considerations.
18. It was felt that in the long run it is worthwhile operating a sector only if it covers all costs of operation which means that the sectoral fare should be equal to LRMC for the sector. For determining whether a particular sector is worth operating in the short run, marginal cost principle — that is the additional cost incurred by operating that flight or the cost saving by not operating the flight (landing charges, fuel cost, direct aircraft maintenance cost and cost related to RPKM) should be the determining factor.
19. It is recommended that the fares in the north-eastern region may be subsidised by 25 per cent in view of the accessibility problems peculiar to that region.
20. The Corporation must be subsidised in case of any concessions extended on non-commercial considerations on the basis of a Government directive or in case Government desires the fares to remain at a relatively lower level on particular routes due to socio-economic or other considerations (e.g. within the north-eastern region).
21. The Air Corporation Act, 1953 may be amended to enable Indian Airlines to receive subsidy even when making an overall profit.

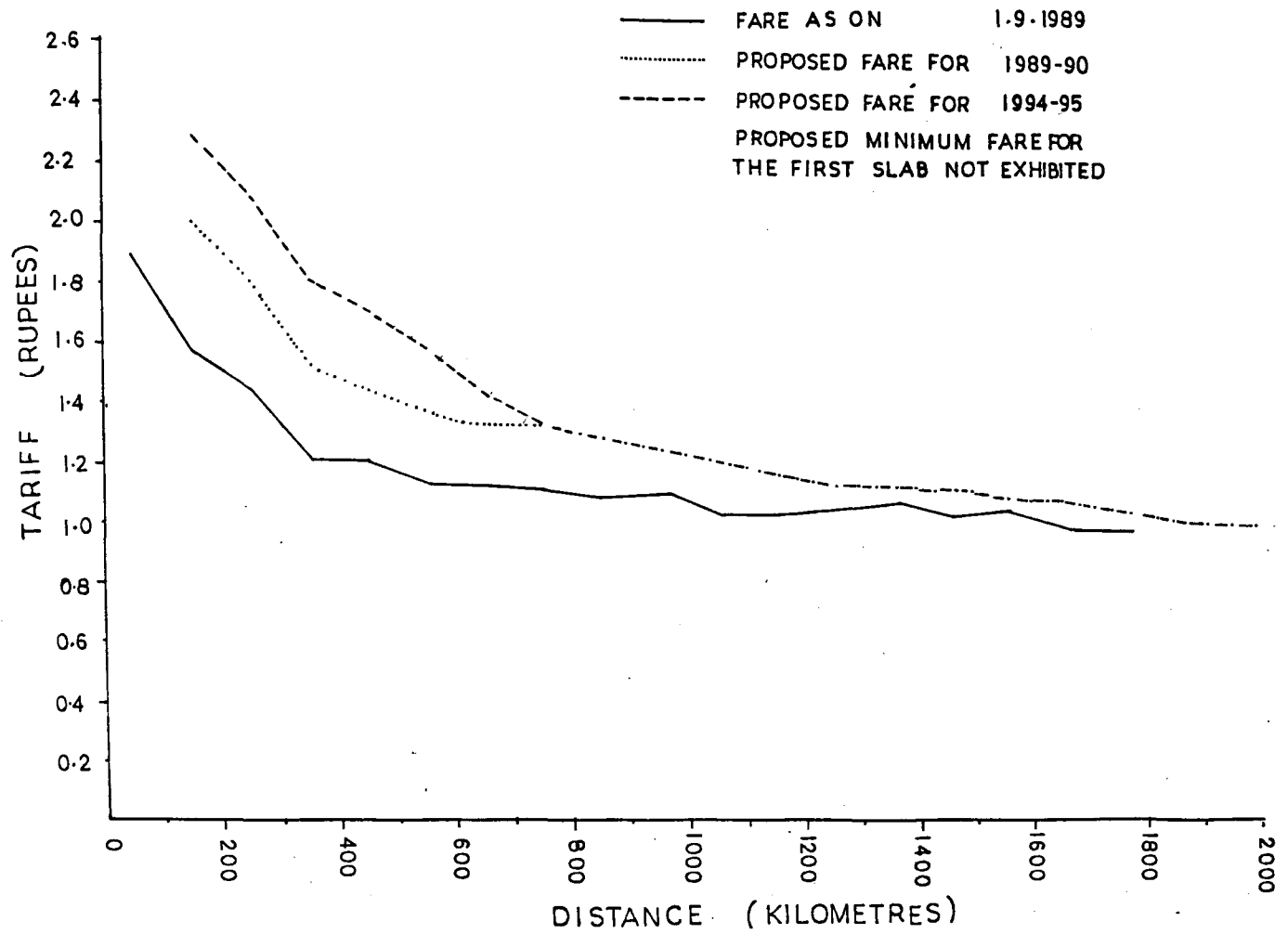
22. It is recommended that every five years a fresh exercise be undertaken for computation of long run marginal costs for the state of art aircrafts available at that time and for revising and updating the norms for the existing aircrafts. An appropriate time for such an exercise could be the last year of every Five Year Plan, when information about demand forecasts, fleet acquisition pattern, etc., are available.
23. Certain items of costs like fuel, landing and navigational charges, wages, stores and spares, and foreign exchange fluctuations which affect repayment obligations need to be reviewed once a year. Indian Airlines must develop a system for productivity measurement and monitoring and distributing productivity gains to users and employees. Since landing and navigational charges, foreign exchange fluctuations, increase in statutory levies and fuel costs are beyond the control of Indian Airlines, 100 per cent increase in these costs should be allowed for escalation purpose. For all other inputs, only 90 per cent of the increases in input costs should be reckoned, the balance to be absorbed by Indian Airlines by way of increased productivity. The weights for the different items in the escalation formula should be based on the share of different inputs in total costs in the base year.
24. The relationship between quality of service and tariff should be clearly discernible. A system of incentives and penalties need to be devised. It is recommended that a scheme be introduced wherein passengers could be compensated for a certain percentage of the fare paid by them if the flights are delayed. Also an incentive system could be evolved wherein employees could be given a bonus above the statutory limits, on the basis of the consumer satisfaction rating, which could be assessed by an independent agency.
25. It is recommended that the process of deregulation be attempted in a phased manner. The foreign exchange constraint is likely to be binding for another decade and therefore, Government control over import of aircraft and liberalisation of the domestic aviation industry must ensure that there is no excess demand on scarce resources.
26. The proposed normative pricing proposals may not necessarily lead to lowering of costs. This can be more appropriately achieved by introducing a degree of competition in the form of another fulfilled domestic airline. It is recommended that appropriate steps could be initiated to introduce a new domestic airline as and when the balance of payment position improves.

27. Infrastructure facilities are provided by two agencies namely; International Airports Authority of India (IAAI) and National Airports Authority (NAA). The present policy of IAAI of determining the landing charges based on negotiations with International Air Transport Association (IATA) for international flights may be continued as the sector needs to generate enough resources for future investment. In so far as Indian Airlines is concerned, the landing charges are about 75 per cent of charges payable for international flights. It is noted that the cost of infrastructural facilities as a percentage of operating cost for Indian Airlines has increased from 2.66 per cent in 1970-71 to 7.8 per cent in 1987-88. It appears that the tariff charged by NAA is not based on a detailed analysis of cost and some element of adhocism cannot be ruled out. The NAA should conduct a cost benefit analysis keeping in view the social cost involved and submit a paper to the Ministry of Civil Aviation. The future increase in tariff should be based on this study.
28. In order to stimulate the development of airports and allied services throughout the country and to provide for a balanced growth it is recommended that IAAI and NAA should be brought under a single organisation namely, Airports Authority of India with IAAI and NAA as its subsidiary companies. This arrangement would provide funds for the development of the airports by IAAI and NAA and contribute to overall development of airports throughout the country.
29. Our airports are required to deal with technologically advanced aircraft as also a growing volume of traffic. There is an imperative need to upgrade facilities at domestic airports in order to avoid mismatch between infrastructural facilities and airline requirements. This would require substantial investments. In this context it is recommended that the customs duty on imported capital equipment needed for setting up of communication and navigation aids should be reduced from the present level of rates varying upto 300 per cent to 25 per cent in order to provide better safety standards at reasonable cost.

EXISTING TARIFF AND AIRCRAFT TYPEWISE COST



EXISTING AND PROPOSED FARE



1 *Introduction*

- 1.1 Civil aviation had its origin in the early years of the present century and developed largely from the operations in the carriage of mail. In India it made its debut in 1924, when the first regular air service was provided. During the period between 1924 and 1953, a number of airlines came into existence but only a few could survive and that too on Government subsidies. Eventually in August 1953, all the surviving airlines were nationalised and two airlines were set up, namely Indian Airlines and Air India.
- 1.2 The civil aviation sector requires large investments in equipment and infrastructural facilities. The technological cycles of a modern civil aviation system, being of a short duration, it becomes necessary to replace equipment and upgrade infrastructural facilities at frequent intervals. Consequently capital requirements for system development and upgradation are high and the problem is compounded when the bulk of capital requirements is in foreign exchange.
- 1.3 The main advantage of air transport lies in its speed. This aspect of air transport helps to optimise technological, managerial and administrative skills. Strategic and defence requirements also necessitate the provision of efficient and reliable network of air services. With the growth of low volume, high value goods, air transport is rapidly gaining importance in the shippers list of priorities.
- 1.4 There are some obvious disadvantages of this mode of transport. The major disadvantage is the high unit cost of transportation. Not only is the unit of

movement relatively small, it also requires expensive protective and handling devices between and at the terminals. While the capacity of the aircraft has been steadily increasing over the years, the effects of the increases have been somewhat offset by the ever increasing cost of aircraft and huge cost involved in the provision of additional terminal and operational facilities. A closely related problem is the fact that air travel costs are such that large volume and high capacity utilisation are necessary to bear them and that the flight must be of sufficient length to make operations economical.

- 1.5 The civil aviation sector in India is structured into two distinct functional entities — operational and infrastructural. Like other large enterprises, the airlines which perform operational functions are organised as corporations. While Indian Airlines and Vayudoot provide domestic air services, Air India provides international air services. Indian Airlines operates mainly medium and long haul routes. In addition, it also operates to some neighbouring countries. The infrastructural facilities are provided by the National Airports Authority and the International Airports Authority. The National Airports Authority manages 86 airports and civilian enclaves at 26 defence airports. The International Airports Authority of India operates the four major metropolitan airports namely Bombay, Delhi, Calcutta and Madras. The regulatory and licencing functions, bilateral issues, approval of tariffs/schedules, etc. are entrusted to the Director General of Civil Aviation.
- 1.6 Domestic air traffic accounts for an insignificant share of the passenger traffic in the country. However, the rate of growth of this traffic has been substantial over the years. Indian Airlines started with a modest beginning in 1953 when it carried 1200 passengers per day; the number of passengers presently carried over its network exceeds 28,000 per day. In 1988-89 it logged over 8700 million passenger kms. The airline operates over 200 flights daily connecting 62 domestic stations and 10 stations in neighbouring countries. The growth rate of traffic has been consistently over 10 per cent till 1985. The Seventh Plan taking into consideration the heavy foreign exchange outgo in the civil aviation sector, moderated the growth to 8 per cent. The growth rate has, therefore, been in the range of 7 to 8 per cent in the Seventh Plan.
- 1.7 Domestic services are also operated by Vayudoot. The *raison d'être* of this airline was primarily to serve inaccessible regions of the north-east where surface transport facilities are inadequate and surface routes circuitous as well as difficult of access. However, Vayudoot has been extending its services to a

number of areas which are readily accessible by road or rail within a few hours of journey time.

- 1.8 A study carried out on the passenger profile of the Indian Airlines in 1986 showed that 80 per cent of the passengers were resident Indians, about 9.5 per cent foreign tourists and 8.5 per cent non-resident Indians who purchased their tickets in foreign exchange. Of the resident Indian passengers over 70 per cent travelled on expense account.
- 1.9 Domestic cargo between 1970-71 and 1985-86 grew at an annual growth rate of 14.1 per cent. The spurt in growth of cargo traffic took place after the Airbus A-300 was introduced in 1975-76. The following years saw an average annual growth rate of about 17.1 per cent.
- 1.10 The capacity of the domestic airline has grown considerably in order to meet the demand. The maximum expansion took place in the 70's when Indian Airlines acquired B-737 aircraft during 1970-71, followed by the wide bodied Airbus aircraft in 1975-76. The present fleet strength of Indian Airlines comprises of 24 B-737, 10 A-300 and 15 A-320 aircrafts. The Vayudoot has a fleet of 10 Dornier, 8 Avro and F-27 aircrafts.
- 1.11 Aircraft utilisation has shown considerable improvement in the Seventh Plan. In fact, the Indian Airlines was able to meet the increase in traffic demand without augmenting its fleet in the first three years of the Plan. The aircraft utilisation also improved from 7.34 (hours/day) in 1984-85 to 8.61 (hours/day) in 1987-88 for B-737 aircraft while it improved from 7.16 hours/day to 7.85 hours/day in the same period for the Airbus aircraft.
- 1.12 The domestic civil aviation system suffers from several weaknesses. The airline does not generate sufficient foreign exchange to finance its requirements. On the other hand, the foreign exchange outgo has far outstripped the foreign exchange earned by the airlines. In 1988-89 it is estimated that the foreign exchange net balance for the airlines is a negative Rs. 81 crores excluding fuel imports. If the fuel factor is also taken into account negative net balance works out to a hefty Rs. 420 crores.
- 1.13 Indiscriminate expansion of air services has resulted in increasing short haul operations which have raised fuel consumption and other operating costs per available seat kms (ASKms). The tariff structure framed three decades ago

hardly reflects the true costs of operations. This is obvious from the route economics of the domestic airlines.

- 1.14 In 1986-87 Indian Airlines operated 152 services of which only 53 generated surpluses. The number of services generated profits have almost stabilised to a constant number, while the number of services which are not covering costs are increasing. About 80 per cent of the total surpluses of Indian Airlines is accounted for by the quadrilateral connecting metropolitan cities. These routes heavily cross subsidise the deficits incurred across the network. The financial performance of the Vayudoot is more distressful. Of the 57 routes operated by Vayudoot in 1987-88, all except three incurred losses despite the fact that bulk of its fleet is fully depreciated.
- 1.15 In a way aviation industry is at cross roads. On one hand, there is a growing demand for domestic air services, triggered by an expanding economy and tourism industry, while on the other hand there are severe constraints on national resources and foreign exchange. At this stage of our economy it is not possible to allocate larger share of resources to the civil aviation sector. It is, therefore, imperative that the aviation sector becomes entirely self-financing and grows through its internally generated resources. At the same time, generation of resources or revenue maximisation alone cannot be the criteria for development of a tariff structure. It has also to be ensured that while the airline recovers the costs, the consumer gets a fair deal.
- 1.16 It has been our endeavour to devise a rational tariff framework which reflects the true costs of operations of the airlines. In the course of development of such a framework a number of crucial policy issues also arose such as deregulation, liberalisation, automation, etc. The Committee studied some of these aspects while framing its recommendations.

2 *Historical Developments*

- 2.1 From the commencement of air services to the present time, the tariff structure has undergone many changes. During the early years, the presence of a large number of private operators and different types of aircraft led to the existence of a large variety of fare rates per passenger mile and freight rates per tonne mile. The tariff was largely dictated by individual airline economics and inter airline competition.
- 2.2 Recognising the need for some sort of regulation in air fares, the Government of India in October 1946, regulated the privately owned scheduled air services through a system of licensing by the Air Transport Licensing Board (ATLB). ATLB prescribed maximum and minimum rates. Lower night fares, seasonal fares, promotional fares, such as family fares were also quoted. Higher fares for fast non-stop superior services also prevailed on certain routes.
- 2.3 With the nationalisation of the domestic air services in 1953, when the Indian Airlines Corporation took over eight privately owned airlines, the need was felt for developing a uniform fare and rate structure taking into account the overall economy of Indian Airlines and the national interest.
- 2.4 A sub-Committee set up by the Corporation for examination of fares and freight rates made the following observations:
 - (a) Fares, other things being equal, should not vary between two different points served by two different connecting services, having regard to passenger convenience, competitive modes of transport, existing load

- factors and the type of aircraft used;
- (b) Attempted rationalisation of fares should not be on the basis of a fixed rate per mile or on the basis of fixed rates per mile worked out for different mileage groups; and
 - (c) In the revision of fares, the guiding factor should be the desire to conserve the existing tariff potential, to tone up the fare structure in the light of convenience of travel, the competitive modes of transport, the existing load potential, operational peculiarities of the routes, etc.

Objectives

- 2.5 Section 7.1 of the Air Corporations Act states that the function of the Corporation shall be "to provide safe, efficient, adequate, economical and properly coordinated services" and each shall exercise its powers so far as "to secure that the air transport services are developed to the best advantage and, in particular, to exercise those powers so as to secure that the services are provided at reasonable charges". Section 9 states that, in carrying out any of the duties vested in it by the Act, each of the two Corporations shall act so far as may be on business principle. Important functions such as the fixation of fares and freight rates, expenditure exceeding specified amounts, etc. require Central Government's previous approval. As per section 34, the Government, in the national interest, can direct the Corporations to undertake any air transport service or other activity, to discontinue or make any change in any scheduled transport service or other activity and not to undertake any activity which it proposes to do. It also states that if, at the direction of the Government, it undertakes any activity which results in an overall loss then "the Government shall reimburse the Corporation to the extent of the loss relatable to the operation of that particular service or activity."
- 2.6 The task of giving "a rational interpretation on the basis of which the principles determining fares and freight rates be formulated" was left to the Air Transport Council (ATC). According to the ATC the words "best advantage" must have reference not only to the commercial success of the Corporation but also to the advancement of the public interest and the overall national interest, since air transport is not only a public utility but also an instrument of implementing national policy both with regard to the country's economy and defence.
- 2.7 In discussing the objectives of rate-making, it states that "neither the social nor the commercial objectives can be ignored. Our problem is to find an appropriate

balance between the two". According to the ATC Report, the objectives of rate-making should be:

- (a) to stimulate the maximum economic volume of traffic;
- (b) to generate surplus revenues on high density traffic routes, which would offset to the largest extent possible the gap between costs and revenues on weak traffic routes; and
- (c) to sustain and promote air traffic by creating preference for it on account of its inherent advantages.

The Two Principles

- 2.8 Commenting on the two basic commercial principles of rate-making, ATC states that "normally, the cost of service determines the lower limit of charge and the value of service the upper limit, the reasonable charge being the cost of service plus a fair profit"¹. It points out two difficulties in applying the cost of service principle namely, (a) precise methods of allocating overhead costs and joint costs to specific services are almost impossible to find, and (b) the actual costs of the services are so high that fares matching them would result in lowering air traffic demand and consequent drop in revenue. The first difficulty makes the approach to the cost determination through ascertainment of individual route cost impracticable. The individual route cost approach, in its opinion, has the disadvantage that it would result in unequal fare rate which would prevent development of well balanced system of our services. It, therefore, relies on "the overall cost approach which computes the cost for the entire system of services, and, if possible, separated by different type of aircraft". It felt that the statutory objective of "properly coordinated air transport service" could not be met if the Corporation were to operate only the profitable services and abandon the non-profitable ones. It must, therefore, try to create proportionate surplus revenues on some routes to cover the gap between costs and revenues on other routes.
- 2.9 As for the application of the value-of-service principle, which results in different rates for similar services, it says that different fares can be justified if (a) they help to promote traffic that would lower overall unit cost; (b) they contribute towards a well-balanced development of air service; and (c) quality of service, length of haul or operating conditions differ.
- 2.10 The Council recognizes two distinctive features of the cost pattern of air transport, namely, (a) air transport costs taper with distance more significantly

than in any other form of transport; (b) since the fixed costs are significantly high, the larger the volume of traffic or the larger the haul, the greater the spread for overheads which lowers the unit traffic costs. On short haul the volume of traffic is low and "the time factor in air travel here is very small". Hence from the cost angle the fare required to break-even would be very high. However, since a fare could place "air transport output of short-haul travel market", and, therefore, "the fare rate has to be fixed at a level lower than that as required on a purely cost basis."

Relation between Air and Railway Fares

2.11 On the question of linking air fares with AC rail fares it notes that "from the point of view of comfort, rail travel by the airconditioned class is only service competing with air travel. The latter has a distinct advantage in the saving of time, while the former provides more restful journey and more liberal free baggage allowance. As both modes of transport are nationalised, their respective rate policies and practices should be such as to preclude unfair competition between them". It states that there is no scientific basis to establish a fair relationship between air fares and air-conditioned class rail fares because (a) the unit costs for any selected group of stage lengths do not correspond; (b) the rail mileage between two points is not the same as the air mileage; and (c) while in rail transport the share of revenue from the AC class was 0.6 per cent of the total passenger revenue, the revenue from the single class passengers of the IA represented 60 per cent of its total revenue.

Tapering Design

2.12 The ATC considered the feasibility of fixing fares on the basis of aircraft-wise operating cost and sector cost of operations but discarded them in favour of a taper which is based on the network cost of operation. It examined the question of the appropriate number of base-rates between the highest and the lowest and how they should be varied. The ATC submitted its report in 1957. The tapering design recommended by the ATC is given below :

Mileage Slab (kms.)	Rate per Mile (paise)
1-30	66
31-100	50
101-200	49
201-500	46
501-900	43
900 and above	40

Concessions

- 2.13 ATC also gave direction to lower these rates by upto 15 per cent in order to promote, sustain or develop traffic. It recommended (a) continuance of allowing 10 per cent discount on the one-way fare for round-trip journeys; (b) concessional fare schemes at the discretion of Indian Airlines for special purposes e.g. to arrest traffic decline, to meet seasonal fluctuations, to give relief in distress, to provide for student concession, family travel, etc. and (c) differential fares between faster and slower services and where there is appreciable difference between the standard of passenger comfort of the two services.

ATC on Freight Rates

- 2.14 The ATC recommended that the excess baggage rate should be equated to the passenger rate, that is the mile rate for one lb. of excess baggage should be equivalent to 1/200th of the passenger fare rate per mile. The basic cargo rate shall be equal to the excess baggage rate (even though the unit cost of cargo in air transport is 15 per cent less). Taking the basic cargo rate as 100, different mark-ups could be fixed to arrive at class rate, specific commodity rate, bulk rate and back-haul rates according to what the traffic can bear and on evaluation of various factors such as physical, transportation and economic characteristics of cargo; social utility of cargo; historic or other important considerations; and competition from similar or other modes of transport.

History of Fares and Freight Rates

2.15 History of Fares

In June 1958, the Government fixed the air fares at about 3/5th of the rates recommended by the ATC. Since then, the fares have been revised 18 times. Until June 1980, the revisions were in the form of percentage increases in the mileage bracket rates, with minor adjustments for the type of aircraft used and concessions for the eastern region. In 1980, fuel surcharges were introduced.

The history of fares is given below:

History of fares

Effective	Fare structure															
15 June, 1958	<table border="1"> <thead> <tr> <th data-bbox="760 419 1013 459">Mileage slab</th> <th data-bbox="1084 419 1404 459">Rate per mile (paise)</th> </tr> </thead> <tbody> <tr> <td data-bbox="760 469 1013 510">1-30</td> <td data-bbox="1084 469 1404 510">40.63</td> </tr> <tr> <td data-bbox="760 510 1013 550">31-100</td> <td data-bbox="1084 510 1404 550">31.25</td> </tr> <tr> <td data-bbox="760 550 1013 590">101-200</td> <td data-bbox="1084 550 1404 590">29.69</td> </tr> <tr> <td data-bbox="760 590 1013 631">201-500</td> <td data-bbox="1084 590 1404 631">28.13</td> </tr> <tr> <td data-bbox="760 631 1013 671">501-900</td> <td data-bbox="1084 631 1404 671">26.56</td> </tr> <tr> <td data-bbox="760 671 1013 713">901 and above</td> <td data-bbox="1084 671 1404 713">25.00</td> </tr> </tbody> </table>	Mileage slab	Rate per mile (paise)	1-30	40.63	31-100	31.25	101-200	29.69	201-500	28.13	501-900	26.56	901 and above	25.00	
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31-100	31.25															
101-200	29.69															
201-500	28.13															
501-900	26.56															
901 and above	25.00															
1st June, 1963	<ul style="list-style-type: none"> — Trunk Routes 17 1/2 per cent increased on taper. — Regional Viscount, Skymaster and F-27 routes: 15 per cent increased on taper. — Regional DC-3 routes (except Eastern region): 10 per cent increased on taper. — Eastern DC-3 routes: 5 per cent increased on taper. 															
1st April, 1965	<ul style="list-style-type: none"> — Point to point fares introduced. — Round trip rebate withdrawn — Stopover permitted on normal fares. — Taper changed: <ul style="list-style-type: none"> 1-200 201-500 501-900 901 and above 															
1st August, 1967	<ul style="list-style-type: none"> — 15 per cent increase on all aircraft except: — 5 per cent increase in Assam, Manipur and Tripura — Taper revised hence 2 levels of fares for India and Assam. 															
1st November, 1969	<ul style="list-style-type: none"> — 8 per cent increase on Caravelle routes — 7 per cent increase on all other routes except eastern region (5 per cent increase). 															
1st July, 1971	<ul style="list-style-type: none"> — 15 per cent increase everywhere except eastern region (7 per cent increase). 															

1st April, 1973	— 5 per cent increase; rounding upto multiple of Rs. 5.
1st February, 1974	— 25 per cent increase on all fares upwards rounding to Rs. 5.
19th November, 1979	— 30 per cent increase on Rupee as well as US Dollar fares; — Excess Baggage 1.1 per cent of increased fare.
June, 1980	— Fuel Surcharge (FS) Introduced: — 20 per cent FS on fare levels Rs. 351 and above — 25 per cent FS on fare levels upto Rs. 350 — No change in passenger baggage charges.
1st August, 1980	— 25 per cent increase on US dollar fares
January, 1981	— Uniform 25 per cent fuel surcharge.
1st April, 1981	— 10 per cent increase on US dollar fares
August, 1981	— 5 per cent increase on passenger basic fares. FS revised to 32 per cent of basic fares. — 10 per cent increase on Excess Baggage Rate (EBR)/Baggage Cargo Rate (BCR)
1st September, 1981	— 5 per cent increase on US dollar fare.
2nd April, 1983	— Additional Fuel surcharge (AFS) introduced at the rate of 6.5 per cent of basic fare.
29th May, 1985	— 12 to 7 per cent increase in basic fare (shown in 2 parts) on the basis of kilometre distance flown. — AFS revised to 18 per cent of basic fare.
18th March, 1986	— Fuel surcharge increased by 10 per cent of the basic fare obtaining before 29th May, 1985. — AFS merged into FS
25th June, 1987	— 10 per cent increase in basic fares. — Executive class fares fixed at a level of 20 per cent higher than economy class fares. — Excess Baggage Rate: 1.1 per cent of total revised fare — Basic Cargo Rate: 1.06 per cent of revised basic fare

16th February, 1989	<p>— Fare increased on slab basis upto 500 kms. as per the following taper.</p> <table border="1" data-bbox="808 304 1300 550"> <thead> <tr> <th data-bbox="873 304 987 334">Distance</th> <th data-bbox="1073 304 1247 374">Average rate (Rs. per km.)</th> </tr> </thead> <tbody> <tr> <td data-bbox="883 385 954 415">1-100</td> <td data-bbox="1166 385 1219 415">1.56</td> </tr> <tr> <td data-bbox="857 419 954 449">101-200</td> <td data-bbox="1166 419 1219 449">1.30</td> </tr> <tr> <td data-bbox="857 453 954 483">201-300</td> <td data-bbox="1166 453 1219 483">1.19</td> </tr> <tr> <td data-bbox="857 487 954 518">301-400</td> <td data-bbox="1166 487 1219 518">1.07</td> </tr> <tr> <td data-bbox="857 522 954 552">401-500</td> <td data-bbox="1166 522 1219 552">1.05</td> </tr> </tbody> </table> <p>— The fares were rounded upto a multiple of Rs. 5.</p> <p>— Baggage rate was revised.</p> <p>— Fares for sectors beyond 500 kms. were not changed.</p>	Distance	Average rate (Rs. per km.)	1-100	1.56	101-200	1.30	201-300	1.19	301-400	1.07	401-500	1.05
Distance	Average rate (Rs. per km.)												
1-100	1.56												
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9th July, 1989	<p>— 30 per cent increase in basic fare component of rupee fares upto 300 kms. distance.</p> <p>— 20 per cent increase in basic fare component of domestic rupee fares for sectors of 301 kms. or more.</p> <p>— EBR/BCR were revised proportionately.</p>												

History of Freight Rates

2.16 **Basic Rate:** In 1955, in accordance with Air Transport Council(ATC) Report the basic cargo rate was fixed at 1.1 per cent of the passenger fare. As per ATC recommendation Basic Cargo Rate (BCR) should be at par with excess baggage rate which was then calculated at 1/200th of the passenger fare; the average weight of passenger and baggage was taken as 200 lbs.

2.17 There was no change in BCR for many years and the rate 1.1 per cent prevailed. However, In April 1984, the BCR became 1.327 per cent of the passenger fare, when 10 per cent increase was taken on the basic rates.

2.18 In June 1987, the Basic Cargo Rates were delinked from the Excess Baggage Rate. The Excess Baggage Rate remained at 1.1 per cent of the revised passenger fare. The Basic Cargo Rate was fixed at 1.06 per cent of the revised passenger fare.

With the increases in basic fare from 9th July, 1989 the Excess Baggage Rates and Basic Cargo Rates were increased porportionately.

Apart from the Basic Cargo Rate, Indian Airlines offer the following rates and charges for carriage of freight on its network.

(a) Minimum Charge

A minimum charge of Rs. 5 or charge for 1 Kg. whichever is higher has been fixed as the minimum charge. This charge is fixed to cover costs involved in handling small documents/consignments.

(b) Bulk Rates (Quantity Discount)

These are directional rates offered for promotion of general cargo. Normally bulk rates are offered at weight breaks of plus 45 Kgs. and plus 100 Kgs. The present level of discounts are 40 per cent for plus 45 Kgs. and 50 per cent for plus 100 Kgs. weight break. In February, 1988, bulk rates structure between the four bases (Delhi, Calcutta, Bombay and Madras) was changed to promote bulk movement of cargo.

The present discount level is as follows:

45 Kgs.	20 %
100 Kgs.	25 %
250 Kgs.	40 %
500 Kgs.	45 %
1000 Kgs.	50 %
1500 Kgs.	55 %
2000 Kgs.	60 %

(c) Specific Commodity Rates

Specific rates are offered for carriage of specific commodities on specific routes and are normally directional. These rates are offered on higher weight breaks of 100, 250 and 500 Kgs. Percentage discount offered is normally arrived at on the basis of various characteristics of the commodity vis-a-vis the available capacity. Commodity rates are lower than bulk rates.

(d) Class Rates

These rates are quoted as percentage increase or percentage decrease to the basic freight rate. For example, newspaper rates are 25 per cent discounted rates and carriage of live animals is surcharged by 100 per cent.

(e) Valuable Cargo

Valuable consignments of gold, platinum, diamonds etc. are categorised as valuable cargo where the freight rates applicable are 200 per cent of the under 45 Kgs. weight. A valuation charge of 0.5 per cent on that part of shippers declared value which is in excess of Rs. 160 per gross Kg. subject to a minimum of Rs. 25 is also charged per shipment.

The subject charges cover the special handling requirements and the risk involved.

(f) Valuation Charge

All consignments whose declared value per gross Kg. is Rs. 160 or more are charged a valuation charge of 0.5 per cent on that part of the shippers declared value which is in excess of Rs. 160, subject to a minimum of Rs. 10 per consignment.

(g) Other Charges

Apart from the above, other charges levied are:

- (i) Documentation fee
- (ii) Cartage charge
- (iii) Surface transportation charges to off-line stations.

Limitations of the Present Tariff Structure

2.19 The ATC Report formed the basis for fixation of fares and freight rates by the Indian Airlines for more than three decades. Some of the limitations of the ATC tapering design for determination of fares and freights and other problems with the existing tariff are given in the following paragraphs:

Changes in Goals and the Environment

2.20 The ATC Report was prepared at a time when the Indian Airlines inherited the aircrafts acquired from eight privately owned domestic airlines. Most of the aircrafts were technologically obsolete. The industry was in an infant stage and hence objectives such as stimulation of air traffic and balanced network development received greater attention. State subsidy was felt necessary for

Note: Since cargo revenue is treated as incremental revenue, we do not take cost as the basis for fixation of cargo rates but it has to be determined on the basis of and totally oriented to the prevalent market conditions/forces.

the development of the industry. Now the industry is self-reliant and technologically advanced. Most of the aircrafts in use and the ones to be purchased are modern and technically efficient.

- 2.21 Air transport being dependent on imports of aircraft and equipment from abroad, and heavy on fuel consumption puts a great strain on the country's foreign exchange resources. Therefore, it is no longer possible to sustain high growth rates in this sector.

Problems with Costing

- 2.22 The ATLB and ATC based their cost estimates on the actual costs of the individual companies of the Corporation. The cost figures did not reflect the opportunity costs of air services as the capital cost figures were in historical prices, most of the aircrafts were obsolete, and there were idle capacities in some routes. Frequent revisions in fares were made to compensate increases in input costs. There was no link between investment planning and the price determination exercise. A tariff based on actual costs does not provide any incentive for the public monopoly to minimise the costs of production and achieve productivity gains over time². The discussion paper on Administered Prices issued by the Government in 1985, recommends LRMC pricing rule for public enterprises. LRMC prices reflect current social costs of producing goods and services for the most efficient plant.
- 2.23 In recommending a tapering design the ATC Report considered factors such as the type of aircraft and the length of haul affecting unit costs. It did not attempt detailed analysis of the source of variations in different components of total costs. Some costs like landing and navigation charges are fixed per trip while fuel and oil, cabin crew and direct maintenance costs vary with block hours (and hence distance). Capital costs vary with plane hours (block hours plus ground time). Passenger food and amenities costs vary with the number of passengers. Even within a cost category e.g. cost of fuel and oil the average and marginal costs differ³. These factors must be taken into account in the design of a rational tariff.

Network Pattern

- 2.24 The Report noted that on short haul, the cost per seat mile was "disproportionately high" and the volume of traffic offering generally very low, but to avoid the problem of placing air transport out of short haul travel market, it stressed that the rate has to be fixed at a level lower than what is

required on a purely cost basis. It also favoured cross subsidisation for this purpose.

- 2.25 At present about two third of the Indian Airlines routes are in the short-haul sector (500 kms. or less). Many Government reports have pointed out that the existing tariff and the political factors are responsible for the misallocation of aircraft use among different routes. The Planning Commission study, dealing with the economics of short-haul operations, finds that only one route having a stage length of 300 kms. is not making losses. The position is almost the same upto 500 kms. The Planning Group on Civil Aviation (PGCA) reports that out of 139 services by Indian Airlines, 46 did not meet total operating costs (as computed by Indian Airlines). Analysis of route-wise costs for 1985-86 and 1986-87, gives the number of services not covering total operating costs as 50 and 44 respectively.
- 2.26 The Report of the Steering Committee for Transport Planning set up by the Planning Commission observes that "the telescopic gradient of fares per seat kilometre between short and long haul sectors are low compared with Europe where the gradient ranges upto 60 per cent. A steeper gradient which reflects higher costs on short haul, will be desirable. A study is required to develop a rational cost based fare structure". Commenting on the heavy cross subsidisation the Report observes that "apart from leading to inefficient allocation of resources within air transport, it has also stood in the way of achieving optimal inter-modal mix the main objective of our transport policy". The PGCA has recommended "that studies be undertaken jointly with regional planning bodies and surface transportation departments to identify short haul corridors where surface transportation connections can be introduced as an alternative to air services."⁴

Rigidity of Fares

- 2.27 The existing tariff structure does not provide flexibility for the Indian Airlines on considerations of marketing environment. The fares on high density and trunk routes are at the same level as fares on lean and developing routes. Further, the demand for air traffic exhibits both seasonal and random fluctuations. Marginal costs are sensitive to the assumed time span. For example in the very short run, for a scheduled flight, the marginal cost of carrying an extra passenger is small when the capacity is not full. The rigid tariff structure has denied the Indian Airlines an opportunity to optimise its revenue through an effective and sensitive price mechanism.

Special Fares

2.28 There are a large number of special fares being offered by the Indian Airlines, many of which are non-commercial in nature. There does not exist any cohesive policy of either market development and yield improvement or of giving reliefs to certain sections of travelling public. Some guidelines are necessary for fixing norms for the special fares, as well as for laying down of a policy in this regard.

The list of various special fares presently available on domestic services of Indian Airlines is given below:

Armed Forces Discount	50 per cent discount on normal adult fare including Fuel Surcharge on the domestic sectors of Indian Airlines.
Student Discount	50 per cent discount on all domestic sectors.
Teacher's Discount	50 per cent discount to a teacher accompanying a group of 10 or more students travelling together on domestic and Indo-Nepal services.
Cancer Patients Discount	50 per cent discount to cancer patients travelling from their place of residence to cancer Institute/Hospital for treatment.
Blind persons Discount	50 per cent discount to blind passengers on domestic services.
Family Discount	A discount of Rs. 50 on one way fare, when atleast 2 members of a family travel together from Madras/Calcutta to Port Blair and Calcutta to Carnicobar.
21 Days South India Excursion	30 per cent discount on US Dollar tariff on any or all of the sectors of Madras, Tiruchirapalli, Madurai, Trivandrum, Cochin, Coimbatore and Bangalore.
Youth Discount	25 per cent discount on US Dollar tariff on domestic and Indo-Nepal sectors.
Tour Conductor's Discount	A tour conductor accompanying at least a group of 10 tourists is charged half the normal fare and if accompanying 15 or more tourists is allowed to travel free.
Discover India Fares	On payment of US \$ 400, unlimited travel is allowed for 21 days with certain routing restrictions on domestic sectors.

India Wonder Fare	A scheme consisting of four fares each priced at US \$ 200, allowing travel for a week each within the North, East, West or South regions. Additional charge of US Dollar 100, if Port Blair is included in the itinerary for the Eastern and Southern Schemes.
Invalid passengers/ stretcher cases	On all types of journeys on Indian Airlines domestic as well as international sectors in Economy Class, Special Fare which is three times the normal adult fare is charged regardless of the fact whether the passenger is a child, infant or of any other category.
War Disabled persons	50 per cent concession on domestic fare (including fuel surcharge) allowed to armed forces personnel invalidated out of services because of permanent disablement suffered in 1962, 1965 and 1971 wars, and their family members (as per list furnished by the Ministry of Defence) travelling on their own expense.
War Widows of Indian Armed Forces	50 per cent concession in air fares as applicable to armed forces personnel.
Personnel of General Reserve Engineering Force	50 per cent concession to personnel of General Reserve Engineering Force on the same terms and conditions as applicable to Armed Forces personnel.
Bravery Award Winners	50 per cent concession to ex-armed forces personnel who are recipient of highest bravery award of levels I & II.

2.29 The above special fares can be divided into two categories. The first category consists of special fares available to foreign tourists coming to India. These include fares like Discover India, India Wonder Fare, Youth Fare, etc. In the context of present marketing environment of Indian Airlines, these fares have a dilutionary impact on Indian Airlines' overall revenues but are considered necessary in the larger interest of promotion of foreign tourists traffic to India. The second category of special fares consists of concessions available to various sections of society viz., students, armed forces personnel, blind people, cancer patients, etc. Special fares for blind people, cancer patients are offered on humanitarian grounds and financial impact of such fares is negligible in view of very limited utilisation. However, utilisation of student concession and armed

forces concession is quite substantial with appreciable impact on Indian Airlines' revenues. It is perhaps necessary to examine the whole question of special fares on domestic services of Indian Airlines. As a commercial organisation, Indian Airlines should offer special fares only as a means of a promotion of traffic for commercial purposes. Any other concession on humanitarian or socio-economic grounds should be on specific directive from the Government.

Dollar Fares

- 2.30 A controversial feature of Indian Airlines' domestic tariff structure has been the existence of domestic fares quoted in US dollars and applicable to foreign tourists, with a considerably large differential between dollar and rupee fare levels.
- 2.31 Indian Airlines introduced the system of quoting its domestic fares in US dollar for sales outside India in 1966, following the massive devaluation of Indian Rupee, so that foreign exchange earnings and revenue of Indian Airlines from foreign traffic could be protected against unfavourable fluctuations of Indian currency vis-a-vis other major currencies. The idea was that the foreign tourist should continue to pay the same amount in his currency as he had been paying before devaluation.
- 2.32 Till 1981, Dollar fares were revised almost at par with the Rupee fares. In view of rather steep decline in the value of Indian Rupee against major currencies of the world and as a measure of tourism promotion, Indian Airlines decided to freeze its Dollar fares at the 1981 level. Since 1981 Rupee fares have been increased by more than 50 per cent, the present differential of about 40 per cent between Rupee and Dollar fares remains only on account of deterioration in the value of Indian Rupee against the US Dollar.
- 2.33 It may be noted that while the allround costs of various components of tourist package to India (viz. international fares, hotel accommodation, surface arrangements, etc.) have been increasing over the years, the share of Indian Airlines in the cost of a foreign tourist package has declined due to voluntary freezing of its Dollar fare levels since 1981.
- 2.34 The National Committee on Tourism has recommended that in the long run, Dollar and Rupee fares should be brought at par. In view of the steeply depreciating value of Indian Rupee against US Dollar, however, it seems unlikely that such parity can be achieved unless there are heavy doses of

increase in Rupee fares at frequent intervals. Also, there is a need to protect the foreign exchange earnings against unfavourable fluctuation of international currency rates. Therefore, it seems unlikely that it will be possible to withdraw the Dollar fares in the foreseeable future.

Pre Determined Route (PDR) Distances

2.35 The present tariff structure is based on sector distances. The pre-determined route (PDR) distances between city pairs do change from time to time, but sector fares once fixed are not realigned with changes in the distances. This has resulted in the present fares not corresponding strictly to sector distances, and also anomalies in fare-rates from sector to sector.

Quality of Service

2.36 Quality of air service depends on "on time performance", frequency of flights, airlines safety and passenger amenities. In competitive markets, when fares are fixed, airlines do engage in non-price competition. A public monopoly provide little incentive to improve the quality of service. A note prepared by the Indian Airlines on 'on time performance' revealed that, during 1983-87 for every 100 take-offs, only five delays were primary delays, while 16 to 20 were consequential delays. Indian Airlines attributes the consequential delays to the capacity constraints. The present tariff of Indian Airlines does not relate to 'on-time performance'.

References

1. Cost of service — this excludes cost of capital. Reasonable charge accounts to average cost including a fair return on capital.
2. A rate of return method, permitting profits proportional to the rate base, provides incentive for a regulated firm to adopt a capital intensive method of production. This is known as the Avrech Johnson effect.
3. See, 'A Study on the Economics and Role of Short Haul Air Services', Planning Commission, January, 1987.
4. Report of the Steering Committee for Transport Planning.

3 *Conceptual Framework for Determination of Airline Fares*

Introduction

- 3.1 The existing fare structure of Indian Airlines is based on the tapering design recommended by the Air Transportation Council (ATC) three decades ago. The tapering design does not fully reflect the cost structure of service rendered by the airline particularly with respect to the length of haul. The Committee on Public Undertakings, in its recent Report observes that "fares have been increased, from time to time, on the basis of increase in total cost of operations without any consideration to standard costs, capacity utilisation or productivity. Nor is there any critical examination of Indian Airlines' proposals for fare revision by an independent body". The Committee desired that steps should be taken to streamline the methodology of determination of fare and freight structure of Indian Airlines. One of the terms of reference of the Committee, therefore, is recommendation of a rational framework for revision of fares.
- 3.2 ATC considered only cost of service and value of service principles in developing a tariff structure. Today, there is a rich body of literature on public sector pricing focussing attention on goals of the firm, its technology and cost structure, market environment and budget constraints. These approaches can be adopted to develop a rational framework for determination of a tariff for domestic airline service and recommendation of guidelines for tariff revision.
- 3.3 Section 2 of this chapter summarises the objectives, nature of service rendered,

regulatory scene and macro perspectives which are relevant for pricing. Section 3 classifies the alternative theoretical approaches to pricing into four broad categories and discusses the merits and demerits of each approach. Section 4 looks into the complex nature of airlines costs and outlines a procedure for computation of long-run marginal costs. The measurement of LRMC is undertaken in chapter 4 and the steps in the transition from LRMC to the tariff are discussed in chapter 6.

Indian Domestic Airlines Scenario

Objectives

- 3.4 Section 7.1 of the Air Corporations Act of 1953, states that the airlines must "provide safe, efficient, adequate, economical and properly coordinated services" and that it should exercise its powers "to secure that the air transport services are developed to the best advantage". According to the ATC, the words "best advantage" must have reference not only to commercial services of the Corporation but also to the advancement of the public interest and the overall national interest, since air transport is not only a public utility but also an instrument of national policy both with regard to the country's economy and defence.
- 3.5 The ATC Report stated that the objectives of rate making should be:
- (a) to stimulate the maximum economic volume of traffic,
 - (b) to generate surplus revenues on high density traffic routes which would offset to the largest extent possible the gap between costs and revenues on weak traffic routes; and
 - (c) to sustain and promote air traffic by creating a preference for it on account of its inherent advantages.

At the present stage of development of the industry and given serious resource (particularly foreign exchange) constraints, the case for stimulation of the maximum volume of traffic appears to be weak. The Seventh Plan projections for the industry were to reduce the demand for budgetary support and control the pressure on foreign exchange reserves. These objectives were to be achieved by restraining average growth of domestic passenger traffic to about 8 per cent per annum, rationalising air services, achievement of reasonable load levels, making the fare structure cost oriented, planning airline services as part of a total tourist package, etc.

- 3.6 As for social goals, given the nature of services rendered by civil aviation industry and the class of its users, it appears that equity considerations are less important. Regional considerations, such as providing services to relatively inaccessible (by surface transport) regions and national defence requirements necessitate departures from purely business considerations. The Air Corporations Act and many Government reports have reiterated the need for quantifying the cost of pursuing social goals and reimbursement of these costs by the Government.

Nature of Services

- 3.7 The airlines provide passenger, freight and mail services. The main advantage of air service lies in saving in time and quality of service. According to the passenger profile survey done by the Indian Airlines in 1986, more than 80 per cent of the total passenger traffic was for business purposes and 17 per cent for vacation purposes. About 82 per cent of the passengers were resident Indians, 8.5 per cent non-resident Indians and 9.5 per cent foreigners. Cargo revenue accounted for less than 10 per cent of the total revenue. Most of the cargo is for business use. These findings indicate that the airline services cater mainly to intermediate rather than final demand. Hence, primarily as an infrastructural service, its fares and charges enter into the cost of production of private and public sector products and services. The price elasticity of demand (which measures the responsiveness of demand to price changes) for passenger service may not be low because most of the passengers travel on expense accounts. For the tourist category, the demand is likely to be elastic.

Regulatory Scene

- 3.8 The traditional argument for public ownership/regulation of airline services is that it is a public utility service. Public monopoly is sometimes justified on the ground that it is a natural monopoly and its services are of public concern. Natural monopoly occurs if the market be served at a lower unit cost with one firm than with two or more firms. Economies of scale (increasing returns to scale) in production can result in an inverse relation between unit cost and volume of output. However, the problem with a monopoly is that it may charge a higher price by restricting output. On the other hand, if we allow more than one firm to exist and if there are excess capacities, they would engage in destructive competition by pursuing predatory pricing practices.
- 3.9 In the early fifties the airline industry was at an infant stage. Government intervention was sought for developing an integrated national network for

achieving social goals such as serving inaccessible (by surface transport) regions and for cross subsidising such sectors from surpluses generated in trunk routes. These goals were sought to be achieved by regulating entry and fixing fares.

- 3.10 Empirical studies on airline costs, based on U.S. and Canadian data reveal that once a carrier reaches a threshold level (6 to 10 aircrafts) the unit costs, for a given stage length and load factor, are approximately constant over a wide range of output (defined in unit of passenger kilometres). These studies reveal substantial economies of density for air carriers at all sizes. Increasing return to density occurs when unit cost decreases with output, holding points served, average stage length and average load factor constant.¹
- 3.11 Some economists contend that because of constant returns to scale, ease of entry and exit and low sunken cost, airline industry satisfies the contestability criterion and hence competition is feasible. During the last decade, many countries have resorted to deregulation of airline industry in order to achieve economic efficiency. In a planned economy like ours, regulation of the airline industry in some form may be necessary to achieve our plan objectives.²

Investment Planning

- 3.12 The procedure followed by Indian Airlines in its investment planning exercise is (a) to make traffic projections; (b) to decide the fleet pattern and estimate the required investment funds; and (c) to work out cost and revenue projections.³ Since there are many uncertainties regarding the type of aircraft available and their technical and economic characteristics, Indian Airlines' procedure of capacity planning on the basis of seats appears meaningful. Further, the rate of projected demand per annum is large relative to the number of seats in a modern aircraft like A-320. Also, the availability of leasing-in and leasing-out options for aircraft make adjustment easier when the actual demand differs from the estimated demand.

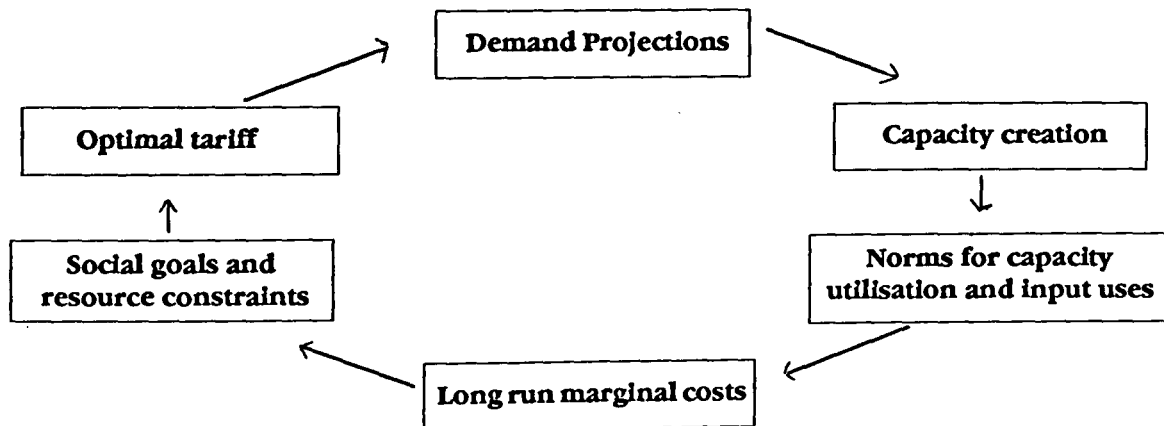
Macro Perspective

- 3.13 One major weakness of administered pricing exercises is a partial or a purely sectoral approach to the pricing problem. Macro considerations are important in transportation planning. Airlines is one of the sub-sectors in our transportation system. About 80-85 per cent of investment in airlines' capacity creation involves foreign exchange. In view of the foreign exchange constraint facing the economy, the shadow price of a foreign currency may be more than

the prevailing official exchange rate. This means that a premium must be attached to the cost of capital. The perspective plan of Indian Airlines uses a discount rate of 10 per cent. Given our foreign exchange resource constraint, the social discount rate could be above 12 per cent.⁴

3.14 About two-fifth of the operating cost of Indian Airlines is for purchase of aviation fuel and oil. The current factor price structure encourages Indian Airlines to opt for more capital intensive alternatives while changing fleet mix and choosing aircraft. Petroleum is a scarce, depletable resource. About three-fifth of our needs are met by imports. However, petroleum products in India are heavily taxed. A decision has to be made on whether the administered prices for the aviation fuel and oil reflect their social costs. A decision in favour of the provision of fuel at social cost would encourage optimum utilisation of capital. However, Indian Airlines' fleet purchase decision and financial policies are regulated by the Government.

3.15 The exercise in investment planning and rate making carried out for public enterprises in France reveals that integration of detailed sectoral pricing models with macro models raises many conceptual and difficult computation problems.⁵ It may not be feasible to carry out such exercises in India. However, we assume that the macro policies are given extraneously. It is easier to visualise the links between capacity creation and prices in the following manner:



In view of the uncertainties about future demand, cost and system parameters, sensitivity analysis is necessary.

Alternative Theories of Pricing

- 3.16 Alternative theories of pricing of public utility services can be classified under four broad categories (a) profit maximising prices; (b) average/fully distributed cost prices; (c) welfare maximising prices; and (d) second best prices. Profit maximising pricing rules are relevant for a private monopolist facing no threat of entry. Different versions of average cost pricing rules have been used by regulatory agencies in fixing administered prices. Welfare maximising prices are relevant for public firms facing no budgetary constraints. Second best pricing rules are appropriate for a public firm which is required to satisfy a budget constraint in the form of earning a fixed amount of profit (which could be negative, zero or positive) or earn a fair return on the capital invested. The first two sets of rules are based on analysis at the firm/industry level while the last two sets of rules can be derived from an industry level while the last two sets of rules can be derived from an industry model or a general equilibrium model. Even in the regulatory context, profit maximising prices are of some interest because they provide upper bounds for the prices.

Profit Maximising Prices

- 3.17 Consider the simple case of a private monopoly producing a single product, q , at a constant unit cost of Rs. c . It faces a downward sloping linear demand curve, $P(q)$ with $dp/dq < 0$. The total profit is given by

$$\pi = p(q) q - cq \quad (1)$$

and the profit-maximising output is given by

$$MR = MC \quad (2)$$

- 3.18 In Figure 3.1 the profit maximising monopoly output is at the point q_m where the revenue realized from the sale of last unit (marginal revenue) is equal to the cost of producing the last unit (marginal cost). The profit maximising price is P_m and the monopoly profit is the area $cbap_m$. At the monopoly equilibrium, consumers' valuation of the marginal unit, in term of their willingness to pay, is P_m which is greater than the cost of producing the marginal unit. Since

$$MR = P + P (1/e) = MC \quad (3)$$

- 3.19 Where e is the price elasticity of demand, which is equal to $(dq/dp) (p/q)$. e measures the responsiveness of quantity demanded to the change in price. e is generally negative and if its value is less than -1 , demand is said to be elastic and if it is more than -1 , demand is said to be inelastic. Equation (3)

can be written as :

$$\frac{P - MC}{P} = -\left(\frac{1}{\epsilon}\right) > 0 \quad (4)$$

- 3.20 The left hand side gives the mark-up. The mark-up factor is lower when demand is elastic and higher when the demand is inelastic.

The point *s* on the average revenue curve is of particular interest. At this level of output q_c price equals marginal (and also average) cost and profit is zero. Consumers' marginal valuation of the good is exactly equal to its marginal cost of supplying the good. We denote q_c and p_c as competitive output and competitive price respectively.

- 3.21 If the monopolist sells n goods q_1, \dots, q_n and his revenue and cost functions are $R(q_1, q_2, \dots, q_n)$ and $c(q_1, q_2, \dots, q_n)$ the profit maximising conditions are given by

$$MR_i = MC_i \quad i = 1, 2, \dots, n \quad (5)$$

Equation (5) states that the monopolist must equate marginal revenue and marginal cost in each market. The above condition implies that

$$\frac{(P_i - MC_i)/P_i}{(P_j - MC_j)/P_j} = \frac{\epsilon_j}{\epsilon_i} \quad (6)$$

i.e. the mark-up has to be higher in a market where the demand is less elastic. If a monopolist can separate the markets (prevent resale), he can practice price discrimination and thereby achieve a higher level of profits. In the transportation literature this price discrimination rule is known as the value of service (what the traffic can bear) principle.

Average Cost/Fully Distributed Cost Pricing

- 3.22 It was noted that private monopoly restricts output and makes large profits. One possible way of extracting larger output from a monopolist is to set a price equal to average cost (including a fair return on capital). In the special case of constant returns to scale, average cost is equal to marginal cost at all levels of output, and market demand determines the volume of output (point *s* in Figure 3.1).

If economies of scale are significant in production, marginal cost curve will be below average cost curve at all positive levels of output. In Figure 3.2 a profit maximising monopoly would choose the price output combination (P_m, q_m) .

By setting a price $P_c = AC$, regulatory agency can expect the monopoly to sell q_c units of output, because at any other output level, except $q=0$, total cost will exceed total revenue.

3.24 Until recently, some version of average cost pricing rule was adopted by regulatory bodies in many countries. Revenue requirements are estimated by either adding a fixed amount to operating cost or allowing a fair return on rate base (allowed capital). In the case of multiproduct firm the rate making exercise is done in two steps (a) determination of level of prices (average price or an index of prices); and (b) structure of prices. As noted by the ATC, difficulties arise in the allocation of joint and common costs among the products. All the three allocation procedures – relative output method, relative revenue method and attributable cost method – are arbitrary in nature.

3.25 It is possible that more than one set of tariff is compatible with the requirement that total revenue equals total cost. The problem of choice, therefore, arises. For example, if a firm produces two products q_1 and q_2 and the revenue and variable cost functions are $R(q_1, q_2)$ and $c(q_1, q_2)$ respectively and the required profit is A , this rule requires that

$$R(q_1, q_2) - c(q_1, q_2) - A = 0 \quad (7)$$

3.26 Equation (7) defines an iso-profit locus in the price space. It might happen that a tariff based on this procedure lies in an inefficient region (a segment with a positive slope). Hence, it is possible to reduce the prices of both commodities and increase the quantities sold of both commodities.

3.27 One problem with average cost pricing is that it ignores demand considerations. This type of regulation, based on actual costs does not provide any incentive for the regulated firm to minimise its cost of production. Under the fair rate of return method of regulation the revenue requirements for a test period are estimated by adding a fair return on the capital base to the operating cost. When the fair rate of return, s , is higher than the cost of capital, r , then the profit becomes $(s - r)K$ where K is capital. Since the allowed profit varies with K and not with other inputs, the firm has an incentive to choose a capital intensive method of production.

Welfare Maximising Prices

3.28 The case for marginal cost pricing of products of public enterprises was articulated by the French Engineer Jules Dupuit as early as 1844.⁶ He suggested

a criterion for measuring social benefit of an activity. A consumer's willingness to pay for a product can be measured by the maximum price he would pay for the purchase of the commodity rather than go without it. Hence, the total benefit to all consumers is the aggregate of maximum possible price at which individual units can be sold. Geometrically the total benefit is given by the area below the demand curve. Algebraically the total benefit is

$$\int_0^q p(q) dq$$

3.29 According to Dupuit the welfare maximising output and price can be obtained by maximising the net social welfare i.e.

$$\text{The solution is } P(q) = dc/dq = \text{marginal cost} \quad (8)$$

3.30 In Figure 3.1., the welfare maximising price quantity combination is (P_c, q_c) . At the level of output q_c

total benefit = area oqcsf

total cost = total revenue = area oqcsc

consumer's surplus = area csf

It is worth measuring the welfare loss due to monopoly pricing. At the level of monopoly output q_m

total benefit = area $0q_m af$

total cost = area $0q_m bc$

profit = area $cbap_m$

consumers' surplus = area $P_m af$

Comparing the two solutions it is obvious that the welfare loss due to monopoly pricing is measured by the area bda.

3.31 Difficulty arises in implementing the marginal cost pricing rule in the case of a decreasing cost industry. In figure 3.2, Dupuit's solution is at the point W where $AC > MC$ and hence the firm will incur loss. Social benefit is maximized but the firm's revenue is not sufficient to cover the total cost. The deficit has to be financed by Government subsidy.

Consider a multiproduct firm with a total cost function $C(q_1, \dots, q_m)$. If the demand for each product in a market depends only on the price prevailing in the market, the total benefit is given by

$$\sum_{j=1}^m \int_0^{q_j} p_j(q_j) dq_j$$

Maximization of the difference between total benefit and total cost (sum of consumers' and producers' surpluses) yields the following conditions for welfare maximization:

$$P_j = mC_j \quad j = 1, 2, \dots, n \quad (9)$$

Equation (9) states that, for maximization of social welfare, equality of price and marginal cost must hold for each product.

- 3.32 Dupuit's solution is based on many restrictive assumptions such as cardinal utility, interpersonal comparisons of utility, independent demands and other products priced at their marginal costs.
- 3.33 Hotelling⁷ formulated a general equilibrium model relaxing all the assumptions of Dupuit. Using the pareto criterion⁸ he found that the ideal pricing rule is the one which equates price of each good to its marginal cost. The intuitive rationale for the rule is that, at the margin, the cost of producing an additional unit of a good is equal to the value consumer attaches to the good. Later, economists such as Lange and Lerner have advocated the marginal cost pricing rule for state enterprises in socialist countries. The rule found its practical application in the nationalised French enterprises for a long time and it is being recommended by many Governments. In India, the Government's White Paper in 1985 advocated long run marginal cost (LRMC) pricing for public enterprises and in the determination of administered prices for the products of regulated industries.
- 3.34 The main advantages of LRMC pricing are that this cost (a) reflects the current social cost; (b) is external to the regulated firm and, therefore, is incentive compatible; and (c) provides the right signals for producers and consumers in their choices. One major drawback of this rule is that its application in the case of decreasing cost industries will result in deficits. Hotelling argues that any departure from MC pricing will mean loss of welfare. He interprets AC pricing as $AC = MC + (AC - MC) = MC + t$ where t is a per unit tax. This tax will distort consumer's choices. He pleads that the deficit could be covered by lumpsum taxes, taxes on items which are inelastic in supply, etc. The difficulty is that Governments may not be in a position to cover the deficits of all decreasing cost industries. In such a situation, the very existence of the firm requires that total revenue must equal total cost.

Second Best Pricing Rules

- 3.35 When a budget constraint is imposed on a regulated public utility, it becomes

necessary to depart from the marginal cost pricing rule, which results in loss of social welfare. The question then is what is the optimal way to depart from the MC pricing rule in order to minimise the welfare loss.

- 3.36 We will consider here three types of second-best pricing rules. Two part/multi part tariff involves non-uniform prices for different blocks, with the price in the last block equal to marginal cost. By charging higher rates for infra-marginal blocks, parts of consumers' surpluses are recovered to cover the deficits. In Ramsey and Boiteux pricing rules, the proportional deviation between prices and LRMC's depend on the price elasticities of demand and the tightness of the budget constraint. Peak load pricing method sets different rates for peak and off peak periods.

Two Part/Multi Part Tariff

- 3.37 One way to meet both the conditions, price = MC and TR = TC is to adopt a two-part tariff. Under a two-part tariff a consumer has to pay a lumpsum fee as well as a per unit charge. The per unit charge must equal long-run marginal cost (Paretian rule) and the lumpsum fee must be fixed in such a way that the total revenue collected i.e. quantity sold X the unit charge) plus (lumpsum fee X the number of consumers) is equal to the total cost. Figure 3.3 illustrates the determination of the lumpsum fee and unit price. The problem with this tariff is that if the fixed cost is large relative to the total cost the lumpsum fee will be large and this will limit the number of consumers. One way to solve this problem is to adopt a multi part or declining block tariff. Still the average price decreases with the quantity bought. This type of tariff is recommended for decreasing cost industries. In the case of air traffic, if output is measured as passenger kilometres/tonne kilometres, then the cost structure is such that the unit cost per kilometre declines with the distance. A tapering fare/freight design is an application of multi part tariff to the airline industry.

Ramsey Pricing

- 3.38 In a seminar paper Frank Ramsey developed a pricing rule in the context of optimal taxation. The Ramsey pricing rule takes the following simple form if we neglect all cross-price elasticities of demand.

$$\frac{P_i - MC_i}{P_i} = k(-1/e_i), \quad i = 1, \dots, n$$

Where MC_i is the marginal cost of producing i th good, e_i is the own price elasticity of demand for i th good and k is a constant, associated with the budget constraint. This rule states that the price cost margin for any good must be proportional to its inverse price elasticity. The price cost margin is larger, the smaller the absolute value of its price elasticity.¹⁰

3.39 Thus Ramsey rule can be interpreted as a second best rule. This rule provides rationale for the value of service or "what the traffic can bear" principle applied in transportation. It may be noticed that Ramsey pricing can stand for low pricing as well as high pricing policies, for deficit enterprises, cost covering enterprises and profit making enterprises. Ramsey pricing converges to monopoly pricing if $k = 1$ and if the monopolist takes account of compensated demand functions".

3.40 If the cross-price elasticities of demand are taken into account, Ramsaey pricing rule takes the form

$$\text{a constant } \sum_j m_j e_{ij} \quad i, j = 1, 2, \dots, n$$

Where $m_j = (P_j - MC_j)/P_j$ is the price cost margin for good, j and e_{ij} is the compensated price elasticity for i th good with respect to j th price. In the case of two products eliminating the constant, we can write

$$\frac{m_1}{P_2} = \frac{e_{22} - e_{12}}{e_{11} - e_{22}}$$

Ramsey pricing involves a trade-off between the level of price and the structure of price.

3.41 Ramsey pricing has an intuitive appeal. When the revenue-cost constraint is binding, prices will deviate from their marginal costs. These distortions involve welfare loss. One way to minimise the welfare loss is to keep the percentage change (from the unconstrained situation to the second best situation) for each good constant. This requires that the mark-up must be higher for the good with less elastic demand and lower for the good with more elastic demand.¹²

3.42 Ramsey pricing rule possesses some attractive properties. The pricing solution always lies in the efficient region of the iso-profit locus. Under certain conditions the prices are also sustainable – they can deter entry.¹³

Boiteux Pricing

3.43 Boiteux's classic paper deals with the pricing policies of public monopolies operating under budget constraints. Boiteux uses the Pareto criterion and obtains a second-best solution in a general equilibrium framework. In his model the economic agents consist of consumers, private producers and public firms. Consumers take prices as given and make their decisions by maximising their ordinal utility functions. Private firms maximise their profits taking prices as given, subject to technology constraints. The public firms are subject to fixed profit constraints. Given the behaviour of private producers and consumers and technology, Boiteux's problem is to find optimal pricing rules for the public firms.¹⁵ One generality of his formulation is that he considers both intermediate and final goods. The model allows for interaction between public and private sectors. Boiteux's solution generalises some of the earlier results and Ramsey pricing emerges as a special case. In the case of independent demands and only one public firm Boiteux's solution is similar to the "inverse price elasticity rule" of Ramsey, but in Boiteux model marginal costs are based on shadow prices and not on market prices. Boiteux model has been extended to consider (a) a general form of budget constraint which includes fixed profit (could be zero or even negative and rate of return regulation as special case; (b) equity aspects¹⁶ of pricing; and (c) non-competitive behaviour on the part of private producers.

Peak-Load Pricing

3.44 In many public utilities, capacities are fixed in short run – a year, a week or a day, but demand varies in known ways from season to season in a year or different days in a week or different time periods in a day. When a uniform price is charged throughout the relevant period, idle capacity in some periods and pressures on capacity in other periods are observed. During peak seasons on peak hours consumers are rationed or they face delays. In the airline industry the problem of seat management in air carriers and utilisation of airport facilities are receiving greater attention.

3.45 To illustrate the gains to society from differential pricing for different sub-periods, consider an enterprise with a simple cost structure – constant per unit capacity cost c and a constant per unit operating cost b , for the relevant time horizon. If the demand is uniform throughout the period, the optimal level of capacity is determined by the intersection of the demand curve DD and the long run marginal (average) cost line $b+c$ at the point e . See Figure 3.4. In this

situation the firm achieves a break-even level at full capacity utilisation. It may be noted that the short-run marginal cost curve becomes vertical line once the capacity is reached. The interesting point here is that $P = LRMC = LRAC = SRMC$.

- 3.46 Now suppose the capacity is fixed at q_k . During the off peak period the demand curve shifts to the left (to D_o, D_o) and during the peak-period the demand curve shifts to the right (to D_p, D_p). With the uniform price equal to $b+c$ demand is less than capacity during the off peak period and greater than capacity during the peak period. During the off peak period capacity is lying idle while during the peak period there is unfilled demand. By offering a price lower than $b+c$ but at least equal to b , demand can be increased during the off-peak period. Rationing by price mechanism during the peak period means setting a price equal to the peak short run marginal cost, which is higher than $b+c$. The important point here is that the prices in both periods are demand determined. In other words, under uniform pricing excess demand during peak period is curbed by some physical mechanism (e.g. queue) while under peak-load pricing the excess demand is cleared by price mechanism, which is in a sense voluntary.
- 3.47 Adoption of peak load pricing policies for airline services and airport facilities will not only result in better utilisation of the capacities but also lead to savings in creation of capacity costs.

LRMC Based Pricing for Airline Services

Case for Second Best Pricing

- 3.48 Indian Airlines is a public monopoly. Decisions regarding the number and type of aircraft, route pattern and tariff are being regulated by the Central Government. Public monopoly enables the Government to achieve social goals and make it act in the public interest. However, the main problem with a monopoly is that it has little incentive to achieve cost minimisation. The existing tariff is actual cost based. The actual costs do not reflect the current social costs partly because the capital costs are based on book value and partly because these costs are affected by various distortions mentioned earlier in this chapter.
- 3.49 One method of introducing competitive pressure, in the present institutional setup, is to develop a tariff based on long run marginal cost. Long run

marginal cost for a service reflects the current social cost of delivering the service using the most efficient plant/equipment available. LRMC's can be based on technical norms, suitable to Indian operating conditions. Since the LRMC computation exercise is for a green-field plant and as the capital costs include depreciation and fair return on capital, LRMC based prices will ensure (ex ante) that the present value of expected net income over the life of the plant will cover the cost of the plant.

- 3.50 The unit cost of service based on the green field plant may differ from the average unit cost of service for existing plants. Overall budget constraint for the company as well as the desire to avoid sharp changes in tariff may necessitate adjustments in tariff in a gradual manner. Pursuit of social goals as well as the need to curb fast rate of growth of demand require departures from LRMC pricing. Hence, second best pricing rules are appropriate.

Choice of Aircraft

- 3.51 Due to many uncertainties regarding the nature and type of technological change in the aircraft industry, the time horizon of the pricing exercise need not be long. Aircraft investment is not lumpy i.e. the annual increment in demand is large relative to the size of an efficient modern aircraft. Existence of leasing-in and leasing-out options also facilitates corrections when demand forecasts are realised. Aircrafts do differ not only in terms of available seats and cargo capacities but also in terms of weight and other characteristics. However, Indian Airlines purchase plan for the near future involves only A-320 aircraft. Hence the cost exercise may be done for A-320 alone.

Market

- 3.52 It is meaningful to treat each city pair as one market. Among other things, the markets differ with respect to the length of haul. Some components of airline service costs are fixed with respect to trips and hence they do not vary with distance. Choice of each city pair as a separate market is also necessary, to take care of special variation in certain cost (e.g. landing and navigational charges depending on whether it is an international or national airport, and fuel prices which vary from state to state).

Time Dimension

- 3.53 It is desirable to take into account the time period for a scheduled flight. If time-varying charges are adopted for aircraft landing and take-off in major

airports and/or the opportunity costs of using aircraft and other resources, whose supplies are fixed, vary in different time periods, then the exercise must also take into account the temporal variation.

Cost Allocation Among Services

3.54 The cost worked out for each city pair, aircraft-wise and by specific time period, has to be allocated among different services. If the mail and cargo services account for a small proportion of revenue (less than 10 per cent in IA) then the mail and cargo services may be treated as by-products and the exercise may concentrate on computation of passenger service after making adjustments in total costs for the mail and cargo services.

Classification of Costs

3.55 One major drawback of the ATC cost analysis is that it does not capture adequately the complexity of airline cost structure. For a meaningful cost exercise, we recommend that the airline costs be classified under five heads, viz. (a) cost per block hour; (b) cost per plane hour; (c) cost related to trips; (d) cost related to passengers; and (e) cost related to capacity. All the cost figures must also be in or converted to the reference period (e.g. 1989-90) prices.

Cost per Block Hour

3.56 Block hour may be defined as the total amount of time elapsed between the time the plane taxis away from one gate and the time the engines are shut-off at the destination gate. Block hour for serving a route includes the amount of time necessary for each take-off and landing and the travel time (based on distance and the cruising speed of the plane involved). Fuel and oil costs, direct aircraft maintenance cost and flying and cabin crew costs vary with block hour. Further, fuel and oil and aircraft maintenance costs per km. decrease with the number of km. flown. Hence the average and marginal costs do diverge.

Cost per Plane Hour

3.57 We define plane hour for a trip as block hour for a trip plus the time required for loading and unloading. The loading and unloading time is approximately constant for each trip and it is independent of the distance flown. It is meaningful to allocate all capital related cost and air insurance costs on the

basis of plane hour rather than block hour. Suppose an aircraft is available for use for 15 hours per day. If the plane is used only for short haul operations the number of trips will be larger (compared with the plane used for long haul operation) but the distance flown and the revenue passenger km will be smaller because for each trip the ground time would be about 45 minutes.

3.58 The capital cost per plane hour can be estimated as follows. Let

- I = cost of new aircraft in rupees
- L = assumed life of aircraft in years
- sI = scrap value of aircraft after L years
- r = the opportunity cost of capital (a weighted average, if the purchase of the aircraft is financed partly by equity and partly by debt)
- H = number of feasible plane hours in a year
- $S^* = sIe^{-rL}$ = The present value of scrap value of aircraft at time L.

Assuming continuous compounding, the capital cost of using the aircraft per year is

$$(I - S^*) (r / (1 - e^{-r}))$$

The cost per plane hour can be obtained by dividing the above expression by the number of feasible plane hours per year, H. Alternatively the capital cost can be computed as a sum of annual depreciation charge and the cost of using capital. With straight-line depreciation, the annual depreciation charge is a constant flow of $(I - sI) / L$. The capital cost flow may not be a constant amount. A non-constant stream would occur if (a) no return on equity is provided in the initial year, (b) the period for repayment of debt is smaller than L and (c) interest is computed on the balance amount of loan due at the beginning of each year. Suppose the feasible pattern for payments of interest on debt and return on equity one year by

$$v_1, v_2, \dots, v_L$$

(some v_i 's could be zero) then the present value of the series can be computed as $\sum_{t=1}^L v_t (1+r)^{-t}$. Then the constant cost flow, v can be obtained by solving:

$$\sum_{t=1}^L v_t (1+r)^{-t} = v \sum_{t=1}^L (1+r)^{-t}$$

Cost Related to Trips

- 3.59 These costs are landing and navigational charges and payments for ground handling staff. These costs are higher for international airports than for domestic airports.

Cost Related to Passengers

- 3.60 These costs are for passengers' food and other amenities and passenger insurance.

Cost Related to Capacity

- 3.61 These costs are indirect operating costs such as administration and other overheads. Regulatory agencies allocate these costs among aircrafts and then among different sectors by one of the fully distributed cost method (relative output, relative revenue or attributable cost). There is some arbitrariness in the allocation of these costs. It may be the case that part of the indirect cost may vary with revenue tonne/passenger km or available tonne km. One way to resolve this problem is to estimate an indirect cost function and then reallocate the cost among the various cost components. If estimation of the cost function is not feasible (or desirable because the cost data are subject to many distortions) or if the indirect cost forms a small part of the total cost, it may be allocated on the basis of attributable cost method.

Sector-wise LRMC's

- 3.62 In order to arrive at LRMC per passenger km for each sector, norms relating to block hour and plane hour for each sector, conversion ratio between executive class and ordinary class seats and load factor are needed. Chapter 5 spells out in detail the method used, the parameters/norms/relationship used and some minor changes in the computation procedure followed (necessitated by informational and other constraints) in the estimation of LRMC's for A-320 aircraft. Since our costing exercise is different from the exercise carried out so far, we have recomputed sectoral costs per passenger revenue km for two existing aircraft, Boeing 737 and AB-300 following our new cost classification. The effects of changes in the norms/parameters/procedures on the cost figures are studied by means of sensitivity analysis.

Uses of LRMC's

- 3.63 Sector wise LRMC figures are used in chapter 7 for determination of whether a particular route is economic or uneconomic and for the development of a criterion for cross-subsidisation. These figures also serve as base values in the development of a tariff in chapter 8. The components of LRMC's (e.g. costs other than capital related costs, cost of operating an extra flight) can be used for providing lower bounds for prices for certain categories of consumers/seasons/sectors.

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$$R(q_1, \dots, q_n) - C(q_1, \dots, q_n) = A$$
where A is the required profit.
The first-order necessary conditions for maximum are
$$P_i - MC_i + (\lambda R_i - \lambda C_i) = 0 \quad i = 1, 2, \dots, n$$
$$R(q_1, \dots, q_n) - C(q_1, q_2, \dots, q_n) = A$$
is the lag range multiplier associated with the revenue-cost constraint. When we ignore cross-

price elasticities of demand $MR_i = P (1 + 1/e_i)$ where e_i is the own price elasticity of demand. Therefore, we can write the first n conditions as

$$\frac{P_i - MC_i}{P_i} = \frac{\lambda}{1+\lambda} \frac{(-1)}{e_i} = \frac{(-1)}{e_i} \quad i = 1, 2, \dots, n$$

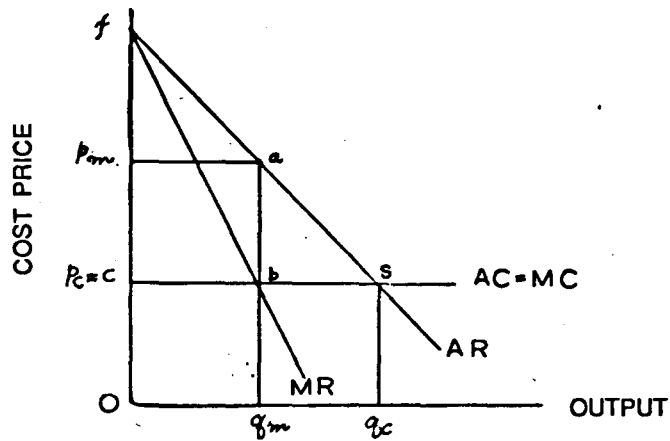
If λ is smaller than the unconstrained maximum level (as will usually be the case) then it can be shown that $0 < \lambda < 1$.

11. D. Bos, "Public sector pricing", in Handbook of Public Economic (eds.) A.J. Auerbach and M. Feldstein, North Holland, 1985.
12. For a lucid presentation and synthesis see W. Baumel and D. Bradford "Optimal departures from marginal cost pricing", American Economic Review, 1970, pp. 265-88.
13. W.J. Baumol, E.E. Bailey and R.D. Willing, "Weak invisible hand theorems on pricing and entry in a multiproduct natural monopoly", American Economic Review, 1977 pp. 350-65.
14. M. Boiteux "On the management of public monopolies subject to budget constraints", Journal of Economic Theory, 1971 pp. 219-40 (translation of article in French in Econometrica 1955.)
15. M. Boiteux was Chairman of Electricite de France at that time.
16. We have ignored equity aspects as distributional objectives are less important in the airline industry.
17. For a survey see D. Bos. cited above.

PROFIT MAXIMISING PRICES

FIGURE 3.1

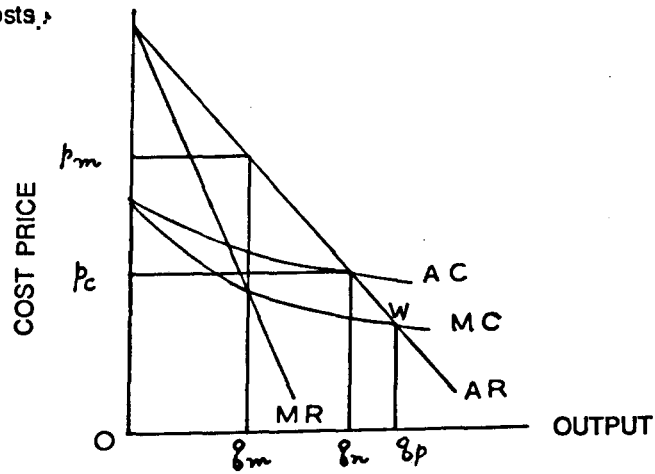
(a) With Constant Costs



- q_m : MONOPOLY OUTPUT
- q_c : COMPETITIVE OUTPUT (OUTPUT AT WHICH $p=MC$)
- p_m : MONOPOLY PRICE
- $cbap_m$: MONOPOLY PROFIT

FIGURE 3.2

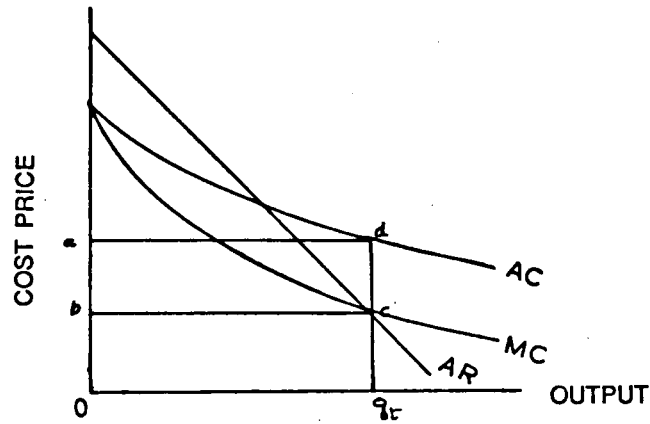
(b) With declining costs



- q_m : MONOPOLY OUTPUT
- q_n : REGULATED OUTPUT
- q_p : OUTPUT AT WHICH $p = MC$
- p_m : MONOPOLY PRICE
- p_n : REGULATED PRICE

FIGURE 3.3

(c) Two Part/Multi Part tariff



TOTAL COST $0q_tda$

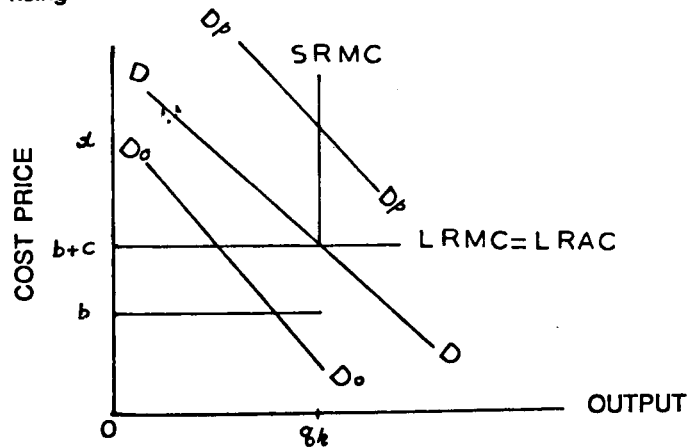
REVENUE AT MARGINAL PRICE $ob = 0q_tcb$

LUMP SUM (LICENCE FEE) = $(bcda / \text{NO. OF CUSTOMERS})$

Q_t : OUTPUT UNDER TWO-PART TARIFF

FIGURE 3.4

(d) Peak Loading Pricing



$b =$ SRMC

$c =$ UNIT CAPACITY COST

$q_k =$ CAPACITY OUTPUT AT WHICH $LRMC=LRAC=SRMC$

$D_o D_o =$ OFF-PEAK DEMAND CURVE

$D_p D_p =$ PEAK DEMAND CURVE

$d =$ SRMC=OFF-PEAK PRICE

$a =$ PEAK PRICE=SRMC DURING PEAK

4 *Estimates of Costs of Airlines Services*

Introduction

4.1 This chapter deals with the estimates of costs for passenger services and is divided into four sections. Section 1 is introductory and section 2 outlines the procedure for estimation of long run marginal costs (LRMCs) for the most modern aircraft available with Indian Airlines i.e., A-320. It takes into account important characteristics of airline cost structure mentioned in chapter 3 and is normative in nature as it is based on technically feasible operating norms under Indian conditions. Section 3 deals with sensitivity analysis of estimates of the LRMCs with respect to changes in the method and certain norms/parameters. Section 4 provides estimated costs of operation of the two existing types of aircraft viz. Boeing 737 and AB-300, which are based on the estimated cost data and follow the same cost classification adopted for computation of LRMC for A-320.

Long Run Marginal Cost for A-320

4.2 The first step in the computation of optimal tariff for airline service is estimation of LRMCs for different services – passenger, cargo and mail service. In the case of Indian Airlines, these services are jointly supplied and the costs incurred are common. However, in the revenue scenario, cargo and mail revenue forms less than 10 per cent of the traffic revenue. Thus, non-passenger traffic revenue accounts for negligible and incidental part of the revenue of Indian Airlines. Hence the Committee decided to treat non-passenger service revenue as a by-product realisation and not to apportion costs to the cargo and mail service.

Choice of Aircraft

- 4.3 LRMC for airlines' service must reflect the current social cost of delivering the service using the cost of efficient aircraft available. The perspective planning exercise of the Indian Airlines considered the purchase of three types of aircraft during the Eighth/Ninth Plan period – 300+ seater, 150+ seater and 100+ seater. Indian Airlines is acquiring 19 A-320 aircraft during 1989-90, and another 12 aircraft of this type during the 1st/2nd years of 8th Plan period i.e. 1990-91 and 1991-92. The induction of 300+ and 100+ seater aircraft is also under contemplation. However, the economy of operation and capital cost data of the latter two types of aircraft are not firm. Therefore, for the computation of LRMC, the Committee has decided to utilise the information available relating to A-320. If, however, new types of aircraft are inducted during the 8th Plan period, the LRMC would require revision.

Classification of Costs

- 4.4 As explained in the previous chapter, for the purpose of the measurement of LRMC's expenditure on the airline, operations could be classified under four groups:
- (a) Cost related to block hours
 - (b) Cost related to trips
 - (c) Cost related to passengers
 - (d) Cost related to capacity (available seat km.)

This classification takes into account important characteristics of air transportation costs which are relevant for pricing. The management information system available in Indian Airlines provides adequate data for the identification of cost for the newly inducted A-320 aircraft to the various sectors.

- 4.5 The following items of expenditure fall under different classifications mentioned above:
- (a) **Cost Related to Block Hours**
 - (i) Cost related to distance and cycle; fuel and oil cost; direct aircraft maintenance.
 - (ii) Cost related to time; flying and cabin crew cost; depreciation and obsolescence of spares; aircraft insurance; interest on borrowings for financing foreign exchange element; and return on equity.

(b) Cost Related to Trips

Landing and navigational charges and handling staff costs.

(c) Cost Related to Passengers

Passenger food and other amenities and passenger insurance.

(d) Cost Related to Capacity (Available Seat Km)

Administrative staff cost; publicity and sales promotion; printing and stationery; and depreciation of assets other than aircraft and spares.

- 4.6 In computing the LRMC, booking agency commission which is related to revenue has not been considered as an element of cost. The same has been taken into account in the final tariff.
- 4.7 In view of the fact that the Committee has decided to treat the non-passenger revenue as a by-product realisation, suitable adjustments have been made in the total cost to take note of this decision. The cost adjustment factor for this element works out to 9 per cent based on the share of the non-passenger revenue to the total traffic revenue for the last 3 years.
- 4.8 The exercise for the determination of LRMC has been carried out assuming an economic life of 15 years for the aircraft. The operating costs are based on budget estimates of 1989-90. The details of quantification of various items of expenditure related to A-320 aircraft and based on Indian Airlines norms are given below:

Fuel and Oil Cost

- 4.9 This expenditure is related to the distance and also to the flight profile of a sector. It includes a constant element for taxiing out/taxiing in, climb and descent, etc. The formula for fuel consumption adopted is $C = 710 + 2.8033D$, where C represents consumption in kg. for a particular trip and D the actual flying distance in km. The factor 710 is constant for all trips and is independent of the distance flown. This formula has been developed by the Indian Airlines based on information supplied by the manufacturers and also on the domestic operating conditions. Because of the above relationship of fuel consumption, the incidence of cost per unit of distance flown declines with increases in the distance. To work out the fuel expenditure of any sector, the fuel consumption obtained by applying the above formula has been multiplied by the current average fuel rate at the stations involved, since the fuel rates are different at the landing and take-off stations.

Direct Aircraft Maintenance

- 4.10 The cost of aircraft maintenance is related to flight cycle and time flown. The aircraft inspection periods have been statutorily laid down by the Airworthiness Authority. Each aircraft requires inspection after every landing. Additional inspection has been laid down after operation of certain number of flying hours or flight cycles. Thus, while certain expenditure on maintenance is related to time flown, a portion of the expenditure is fixed for each flight. Based on the indications given by the manufacturers of A-320 aircraft, Indian Airlines has evolved a technical formula for the computation of maintenance charges for each flight. According to the formula, the maintenance charges for each flight is calculated as follows:

$$M = 6276.6 + 130.02 (T-13)$$

where M is the total cost of maintenance in Rupees per flight and T is the block time in minutes. The variable content and the fixed content are represented by 130.02 per minute and 6276.6 respectively. The maintenance charges for each flight are determined on the basis of the estimated block time.

Flying and Cabin Crew

- 4.11 Flying and cabin crew costs have been measured taking into account the crew composition and the salaries and allowances payable to them. This cost is related to block hours. The estimates of crew cost of 1989-90 include a provision of 20 per cent of cockpit crew salaries, to provide for the training of new pilots in view of the additional requirements and heavy turnover of pilots.

Landing and Navigational Charges

- 4.12 The present actual landing and route navigational charges applicable to the aircraft on the basis of the existing NAA, IAAI tariff at different stations have been considered for each flight. The mean rate is adopted where the landing is on IAAI airport and the take-off is from NAA airport like the flight from Jaipur to Delhi.

Handling

- 4.13 The manpower component of the cost for check-in, loading and unloading of the aircraft has been reckoned on the basis of actual deployment of staff.

Depreciation

- 4.14 Aircraft and engine have been depreciated for a period of 15 years to 10 per cent residual value based on straight line method. Provision for obsolescence of the cost of spares acquired with the aircraft has been provided at the rate of 6.67 per cent per year.

Aircraft Insurance

- 4.15 Aircraft insurance is based on average rate of insurance for the last 3 years as the existing premium rates are too low and cannot be considered as the norm for the industry. For the purpose of computation, the insured value of an aircraft has been adopted as 45 million US Dollars. The insurance premium is adopted at a uniform rate of 1 per cent of the insured value per annum.

Interest on Borrowing for Financing Foreign Exchange Element

- 4.16 The interest and financing charges have been worked out on the basis of the financing pattern of foreign exchange cost.

Return on Equity

- 4.17 Return at the rate of 12 per cent after tax has been considered on the funds to be utilized out of its own resources.

As LRMC is based on the cost of green-field equipment, and as Indian Airlines is inducting 31 A-320 aircraft in three phases, the entire cost of acquisition has been recognised as a package cost for the acquisition of the green-field equipment for the purpose of arriving at the capital related charges. The details of the patterns of acquisition and the costs are given in Annexure I.

- 4.18 The capital related charges representing depreciation, insurance and interest have been related to the norm of 2850 hours per year per aircraft. The incidence of capital related charges per hour on an average work out to Rs. 44911.

- Depreciation & Obsolescence	Rs. 16168
- Insurance	Rs. 2447
- Interest (including return on own funds)	Rs. 26296
- Total	<u>Rs. 44911</u>

Cost Related to Passengers

4.19 This includes food, amenities and passenger insurance.

Administrative and Staff Cost and Others

4.20 These have been reckoned on the basis of ASKms.

Sector-wise Cost/ASK

4.21 The cost/ASK at 70 per cent seat factor has been computed, after making allowance for deadload at 9 per cent of the total cost and a mark up for booking agency commission (3.65 per cent of the fare). The resulting figures are given in Annexure 1. The costs of operation per ASK for various distance slabs of 100 kms each, have been arrived at by adding the costs for all the sectors falling within a specified distance slab and dividing the same by the related ASKm. The same are given in Table 4.1.

Table 4.1

LRMC's for A-320 With 15 Years Life, 2850 Block Hours and 70 per cent Seat Factor	
Distance Slab (kms.)	Cost/ASKM (Rs.)
1-100	4.839
101-200	3.160
201-300	2.236
301-400	1.881
401-500	1.663
501-600	1.529
601-700	1.419
701-800	1.344
801-900	1.304
901-1000	1.253
1001-1100	1.219
1101-1200	1.185
1201-1300	1.161
1301-1400	1.154
1401-1500	1.152
1501-1600	1.108
1601-1700	1.105
1701-1800	1.082

Sensitivity Analysis of The LRMC Estimates

4.22 The LRMC exercise for A-320 aircraft is based on certain assumptions and norms. This section considers the sensitivity of the estimates to changes in certain norms and the method adopted.

Seat Factor

4.23 The seat factor of 70 per cent is well above the average achieved in many countries, but it is lower than the actual average seat factor achieved by Indian Airlines in recent years. Table 4.2 gives the cost estimates at 67 per cent and 75 per cent seat factors for various distance slabs.

Block Hours

4.22 The effects of reducing the assumed block hours from 2850 hours to 2700 hours are shown in the last column of Table 4.2.

Table 4.2.

Sensitivity of LRMC to Changes in Certain Norms: A-320 Aircraft				
Distance Slabs (kms.)	Block Hours 2850 Cost/ASK (Rs.)		Block Hours 2700	
	At 67%	At 70%	At 75%	At 70%
1-100	3.056	4.839	4.517	4.969
101-102	3.301	3.160	2.949	3.244
201-300	2.336	2.236	2.067	2.295
301-400	1.966	1.881	1.756	1.931
401-500	1.737	1.663	1.552	1.706
501-600	1.597	1.529	1.427	1.569
601-700	1.482	1.419	1.324	1.456
701-800	1.404	1.344	1.254	1.379
801-900	1.362	1.304	1.217	1.337
901-1000	1.309	1.253	1.170	1.286
1001-1100	1.274	1.219	1.138	1.251
1101-1200	1.238	1.185	1.106	1.216
1201-1300	1.213	1.161	1.084	1.192
1301-1400	1.206	1.154	1.077	1.184
1401-1500	1.203	1.152	1.075	1.181
1501-1600	1.158	1.108	1.034	1.137
1601-1700	1.154	1.105	1.031	1.133
1700-1800	1.131	1.082	1.010	1.111

Premium on Foreign Exchange Components of Cost

4.25 The costs of certain inputs to Indian Airlines like aircraft engines, spares, etc. have to be paid in foreign currencies. In case of fuel, though, Indian Airlines does not directly pay for it in foreign exchange, the bulk of the fuel has to be imported and the nation has to pay in foreign exchange. In exercises relating to social cost benefit analysis done by the Planning Commission at the macro level, about 25 per cent premium is assumed in respect of such costs. Applying the same concept for the limited purposes of evolving tariff for domestic air services, an attempt has been made to assess the incidence of premium at 25 per cent in respect of these items of cost. If instead of customs duty on aircraft, engines and spares, 25 per cent premium is assumed for the computation of economic cost, the cost per ASK will increase approximately by about 9 per cent. Similarly, if the fuel is made available to Indian Airlines at the international price and 25 per cent premium is reckoned, the LRMC per ASK is likely to come down by about 3 per cent. The net effect of assuming 25 per cent premium on foreign exchange components of cost would be an increase of approximately 6 per cent in the LRMC per ASK.

Plane Hours

4.26 The above exercise is based on 2850 block hours per annum. These hours do not include the ground time for loading and unloading the aircraft. The loading and unloading time is independent of the sector and hence distance. As the flying time and the time for loading and unloading is the time period for which an aircraft is utilised during a flight, it would be more appropriate to determine the capital based charges using plane hours rather than block hours. This exercise would clearly show the expensiveness of short haul.

4.27 LRMC estimates based on plane hours (block hour plus loading and unloading time) for different distance slabs at the assumed level of seat factor i.e. 70 per cent are given in Table 4.3. Comparison of LRMC estimates, with 70 per cent seat factor, for the two methods – with and without inclusion of loading and unloading time is shown in Figure 4.1. It may be noticed that the cost estimates with loading time are higher than the estimates without loading time for sectors with distances of 600 km. or less.

Table 4.3

Comparison of LRMCs, at 70 per cent Seat Factor Exclusive and Inclusive of Loading and Unloading Time		
Distance Slab (kms.)	Block Hours (Rs./ASK)	Block Hours plus Loading & Unloading time (Rs./ASK)
1-100	4.839	5.820
101-200	3.160	3.656
201-300	2.236	2.467
301-400	1.881	2.012
401-500	1.663	1.726
501-600	1.529	1.553
601-700	1.419	1.415
701-800	1.344	1.320
801-900	1.304	1.266
901-1000	1.253	1.204
1001-1100	1.219	1.159
1101-1200	1.185	1.118
1201-1300	1.161	1.086
1301-1400	1.154	1.076
1401-1500	1.152	1.068
1500-1600	1.108	1.020
1601-1700	1.105	1.012
1701-1800	1.082	0.986

Estimation of Operating Cost for the Existing Fleet

4.28 Presently, Indian Airlines is operating the following types of aircraft:

- Airbus 300
- Boeing 737
- Airbus 320 (newly acquired)

In this section, an attempt has been made to estimate the cost of operation of the existing types of aircraft i.e. Boeing 737 and Airbus 300.

Classification of Costs

4.29 As stated in the section on long run marginal cost, expenditure on operation

of the aircraft has been classified into the following four categories:

- (a) Cost related to block plane hours
- (b) Cost related to trips
- (c) Cost related to passengers
- (d) Cost related to capacity (available seat km)

All the items of expenditure have been identified to the aircraft and for each sector in the manner indicated in the section referred to above. Booking agency commission has been taken care of in the tariff. The Committee decided to treat non-passenger revenue as a by-product realisation and, therefore, suitable adjustment in the estimated cost has been made to take note of this decision. The cost adjustment factor for this element works out to 9 per cent based on the share of non-passenger revenue to the total revenue for the last three years. A brief item-wise description is given below:

Fuel and Oil Cost

4.30 This cost has been worked out on the basis of consumption norm formula developed by the Indian Airlines based on the study of operational performance. The formula for fuel consumption is as given below:

$$\text{AB-300 } C1 = 2118 + 7.613D$$

$$\text{B-737 } C2 = 1092 + 3.2926D$$

C1 and C2 represent consumption in kg. for a particular trip and D the actual flying distance in km. The factors 2118 and 1092 represent the fixed elements of fuel consumption for each trip of Airbus 300 and Boeing 737 respectively. The other numbers represent the consumption per unit distance flown. The fuel cost is arrived at on the basis of the consumption worked out for each sector and the average of the fuel rates at the stations involved in each sector, since the fuel prices are different at different stations.

Direct Aircraft Maintenance

4.31 The cost of aircraft maintenance is related to flight cycle and distance flown. The aircraft inspection periods have been statutorily laid down by the Airworthiness Authority. Each aircraft requires inspection after every landing. Additional inspection have been laid down after operation of certain number of flying hours or flight cycles. Thus, while certain expenditure on maintenance is related to time flown, a portion of the expenditure is fixed for each flight.

Indian Airlines has developed, over a period of time, a formula based on actual experience for arriving at the maintenance cost for each sector and each type of aircraft which is given below:

$$\text{AB-300} \quad M1 = \text{Rs. } 14243 + 260.55 (T-15)$$

$$\text{B-737} \quad M2 = \text{Rs. } 2958 + 72.30 (T-11)$$

where M1 and M2 represent the maintenance expenditure for each sector and T1 and T2 represent the block time for each sector in minutes. The fixed elements of cost for maintenance for Airbus 300 and Boeing 737 for each flight are Rs. 14243 and Rs. 2958 respectively, while variable costs for maintenance per minute are Rs. 260.55 and Rs. 72.30 respectively. The cost includes stores consumed, direct labour and outside repairs. On the basis of the block time for each sector, the maintenance cost is determined adopting the above formulae.

Flying and Cabin Crew

4.32 Flying and cabin crew cost has been measured taking into account the crew composition and the salaries and allowances payable to them. This cost is related to block hours.

Landing and Navigational Charges

4.33 The present actual landing and route navigational charges applicable for different stations have been considered on the basis of the scales prescribed by NAA and IAAI.

Handling Cost

4.34 This cost has been reckoned on the basis of actual deployment of manpower for check-in, loading and unloading for each type of aircraft.

Depreciation

4.35 The depreciation charge has been reckoned on the basis of actual incidence of depreciation for the period 1990-91 to 1994-95. Aircraft and engines have been depreciated on straight line method over periods of 12 years and 15 years to 10 per cent residual values for Boeing 737 and AB-300 respectively. Obsolescence on spare parts proposed to be written off for the pricing period has also been considered.

Aircraft Insurance

- 4.36 This expenditure has also been reckoned on the basis of estimated incidence for the year 1990-91 to 1994-95. In estimating this expenditure, average of the insurance rates for the last 3 years has been considered.

Interest on Long Term Borrowings

- 4.37 The financing charges payable till 1994-95 have been considered on the basis of the schedule of repayment.
- 4.38 The capital based charges representing the above elements of cost have been related to the estimated block flying hours and a rate per hour has been evolved. The capital based charges per hour work out to Rs. 13215 and Rs. 4302 for AB-300 and B-737 respectively. The average ages of B-737 and AB-300 fleets as on 31st March, 1989 are 11 years and 3 months and 9 years and 11 months respectively.

Cost Related to Passengers

- 4.39 Cost related to passengers representing the food amenities and passenger insurance have been reckoned on the basis of the budget estimates for 1989-90.

Administrative staff cost

- 4.40 Administrative staff cost and other costs have been estimated based on 1989-90 budget estimates and the unit incidences have been worked out on the basis of ASKms.
- 4.41 The sector cost of operation for the various distance slabs of 100 km. each has been arrived at by adding all the costs mentioned above for all the sectors falling within a specified distance slab and dividing the same by the related ASKms.

Return on Equity

- 4.42 Indian Airlines have, over a period, built up an equity capital including reserves to the extent of Rs. 432 crores as on 31st March, 1988. They have no short term borrowings to meet the requirement of working capital which is financed from the networth only. Therefore, return on the equity capital has also been

recognised at 12 per cent after tax. For this purpose, return on networth has been related to the operating cost to arrive at a ratio of return to operating cost and this ratio has been utilised to apportion the return required to the operating cost of the different types of aircraft for the different distance slabs.

Sector-wise Cost/ASK

4.43 The estimated costs, including a fair return, for the various distance slabs for AB-300 and B-737 at 70 per cent seat factor after allowing for dead load and booking agency commission are given in Table 4.4 and Annexures II and III.

Table 4.4.

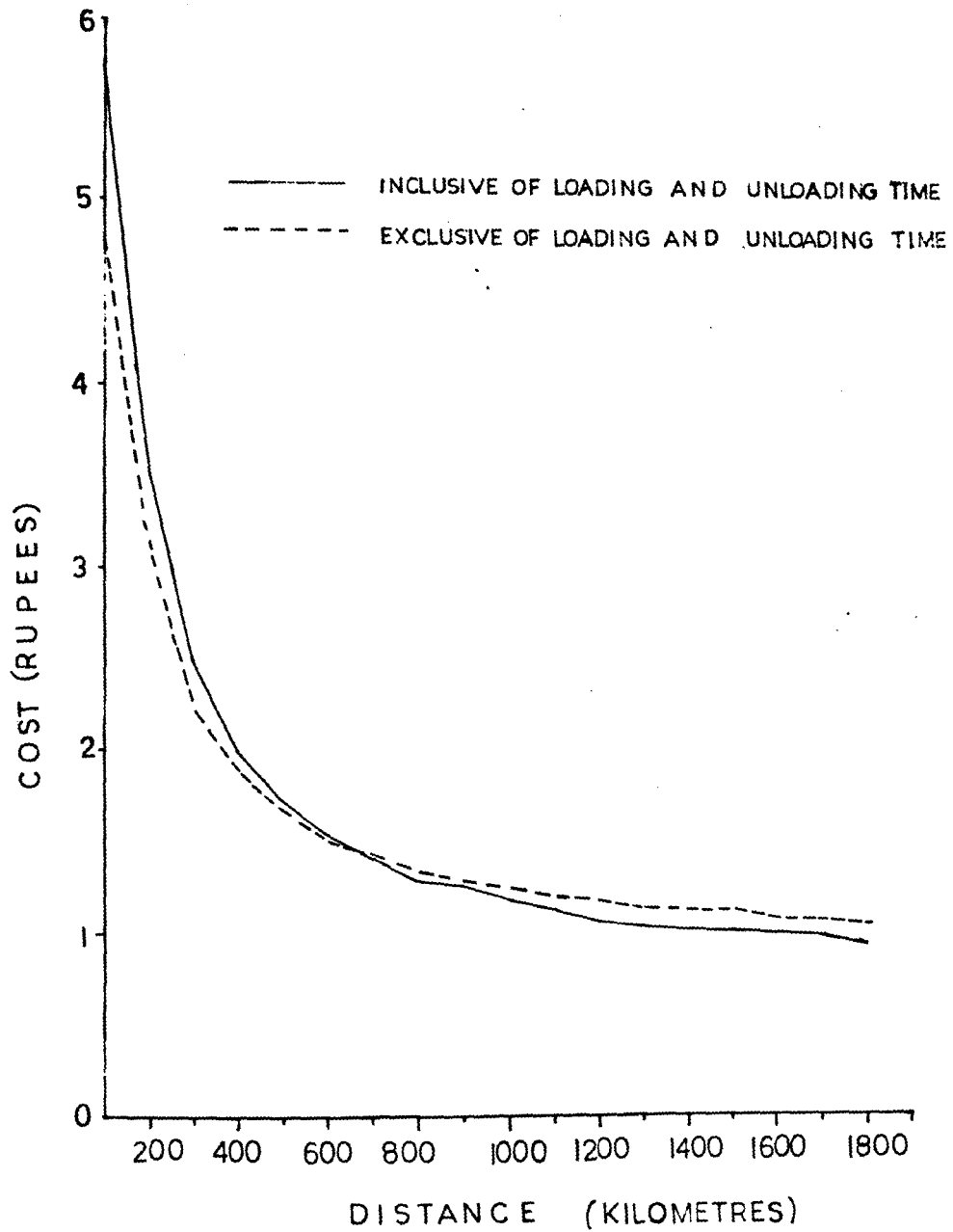
COST/ASK for B-737 and AB-300 types of aircraft at 70 per cent Seat Factor (Rs.)		
Distance Slab (kms.)	B-737	AB-300
1-100	3.423	*
101-200	2.270	*
201-300	1.627	*
301-400	1.392	*
401-500	1.249	*
501-600	1.158	1.371
601-700	1.072	1.262
701-800	1.028	1.200
801-900	1.003	1.166
901-1000	0.962	1.114
1001-1100	0.940	1.084
1101-1200	0.917	1.054
1201-1300	0.896	1.028
1301-1400	0.897	1.027
1401-1500	0.899	1.029
1501-1600	0.853	0.974
1601-1700	0.862	0.981
1701-1800	0.834	0.949

* Not given as AB-300 is not operated in these distance slabs.

FIGURE 4.1

LONG RUN MARGINAL COST FOR A-320

(2850 BLOCK HOURS 70% SEAT FACTOR)



A - 320 SECTOR COST BASED ON 15 YEARS ECONOMIC LIFE
AND UTILISATION OF 2850 HOURS PER ANNUM PER AIRCRAFT

ANNEXURE I

SECTOR	DIST KMS	BLOCK TIME IN MTS	ASK IN	LANDING FUEL COST	CREW	MAINT	HANDLING COST	CAPITAL COST	COST RLTD TO ASK/RPK	TOTAL COST	COST/ ASK	COST/ASK LESS ALLOW FOR DEAD LOAD	AT 70% S.F. WITH COMM (R.)		
LKO/KNU	61	81.20	10248	5188	6697	1115	8642	1625	23350	1455	48073	4.691	4.269	4.438	6.329
IXS/IMF	93	33.42	15624	5188	7465	1195	8932	1625	25818	2219	51641	3.305	3.008	3.122	4.460
JGA/BHJ	100	33.91	16800	5188	8551	1212	8995	1625	25382	2306	53340	3.175	2.889	2.999	4.284
AMD/BDQ	102	34.05	17136	5188	8459	1217	9013	1625	25486	2433	53423	3.118	2.837	2.944	4.206
BOM/PNQ	122	35.44	20496	8292	8859	1267	9194	1625	26528	2910	58676	2.863	2.605	2.704	3.863
TRZ/IXM	124	35.58	20832	5188	8341	1272	9213	1625	26633	2958	55229	2.651	2.413	2.504	3.577
TEZ/JAH	137	36.49	23016	5188	8460	1304	9330	1625	27310	3268	56485	2.454	2.233	2.318	3.311
GAU/TEZ	137	36.49	23016	5188	8307	1304	9330	1625	27310	3268	56332	2.448	2.227	2.312	3.302
BHO/IDR	167	38.57	28056	5188	9197	1379	9602	1625	28073	3984	59847	2.133	1.941	2.015	2.878
IXJ/SXR	176	39.20	29568	5188	9371	1401	9683	1625	29342	4199	60809	2.057	1.871	1.942	2.775
COK/TRV	180	39.48	30240	5188	9103	1411	9719	1625	29550	4294	60891	2.014	1.832	1.902	2.717
UDR/AMD	188	40.03	31584	5188	10284	1431	9792	1625	29967	4485	62772	1.987	1.809	1.877	2.682
DEL/AGR	206	41.29	34608	8292	9368	1476	9955	1625	30904	4914	66534	1.923	1.749	1.816	2.594
AMD/RAJ	206	41.29	34608	5188	11024	1476	9955	1625	30904	4914	65146	1.882	1.713	1.778	2.540
ATQ/IXJ	213	41.77	35784	5188	9914	1493	10018	1625	31269	5081	64589	1.805	1.643	1.705	2.435
AGR/JAI	219	42.19	36792	5188	10217	1508	10072	1625	31582	5224	65417	1.778	1.618	1.679	2.399
IXA/IXE	220	42.26	36960	5188	10236	1511	10081	1625	31634	5248	65523	1.773	1.613	1.674	2.392
VNS/PAT	224	42.54	37632	5188	10222	1521	10117	1625	31842	5344	65859	1.750	1.593	1.653	2.361
ALD/GOP	224	42.54	37632	5188	10076	1521	10117	1625	31842	5344	65714	1.746	1.589	1.649	2.356
GAU/DMU	243	43.86	40824	5188	10563	1568	10289	1625	32832	5797	67862	1.662	1.513	1.570	2.243
DEL/JAI	246	44.07	41328	8292	10693	1576	10317	1625	32988	5869	71359	1.727	1.571	1.631	2.330
VNS/LKO	246	44.07	41328	5188	10560	1576	10317	1625	32988	5869	68122	1.648	1.500	1.557	2.224
BLR/CALC	251	44.42	42168	5188	11129	1588	10362	1625	33249	5988	69128	1.639	1.492	1.548	2.212
PAT/IXR	254	44.63	42672	5188	11152	1595	10389	1625	33405	6059	69414	1.627	1.480	1.536	2.195
JRH/GAU	259	44.98	43512	5188	11004	1608	10434	1625	33666	6179	69703	1.602	1.458	1.513	2.161
DEL/IXC	261	45.12	43848	8292	10088	1613	10452	1625	33770	6226	72066	1.644	1.496	1.552	2.218
SXR/LEH	263	45.25	44184	5188	11394	1618	10470	1625	33874	6274	70443	1.594	1.451	1.506	2.151
RPR/NAG	283	46.65	47544	5188	12746	1668	10651	1625	34916	6751	73546	1.547	1.408	1.461	2.087
MAA/BLR	272	45.88	45696	8292	11624	1640	10552	1625	34343	6489	74564	1.632	1.485	1.541	2.202
IXZ/CBD	280	46.44	47040	5188	12105	1660	10624	1625	34760	6680	72642	1.544	1.405	1.459	2.084
IXU/BOM	282	46.58	47376	8292	12496	1665	10642	1625	34864	6727	76311	1.611	1.466	1.521	2.173
BHO/HJR	283	46.65	47544	5188	11852	1668	10651	1625	34916	6751	72651	1.528	1.391	1.443	2.062
GAU/IMF	285	46.79	47880	5188	11442	1673	10669	1625	35020	6799	72416	1.512	1.376	1.428	2.041
DEL/GWL	296	47.55	49728	8292	11419	1700	10749	1625	35593	7041	76460	1.538	1.399	1.452	2.075
BHO/NAG	302	47.97	50736	5188	13095	1715	10823	1625	35906	7205	75556	1.489	1.355	1.407	2.009
BLR/IXE	302	47.97	50736	5188	12772	1715	10823	1625	35906	7205	75233	1.483	1.349	1.401	2.001
HJR/VNS	306	48.25	51408	5188	12084	1725	10850	1625	36114	7300	74895	1.457	1.326	1.376	1.966
MAA/TRZ	307	48.32	51576	8292	12102	1727	10869	1625	36166	7324	78104	1.514	1.378	1.430	2.043
JAI/UDR	309	48.46	51912	5188	12720	1732	10887	1625	36270	7372	75794	1.460	1.329	1.379	1.970
IXJ/LEH	314	48.80	52752	5188	12249	1745	10932	1625	36531	7491	75760	1.436	1.307	1.356	1.938
BOM/BHU	319	49.15	53592	8292	13562	1757	10977	1625	36791	7610	80615	1.504	1.369	1.421	2.030
AGR/KHJ	324	49.50	54432	5188	12370	1770	11022	1625	37052	7729	76756	1.410	1.283	1.332	1.903
IXB/GAU	330	49.92	55440	5188	13091	1785	11077	1625	37364	7872	78002	1.407	1.280	1.329	1.898
ATQ/SXR	330	49.92	55440	5188	12539	1785	11077	1625	37364	7872	77450	1.397	1.271	1.319	1.885
IXR/COU	341	50.68	57288	8292	13589	1812	11176	1625	37938	8135	82565	1.441	1.312	1.361	1.945
COU/IXA	341	50.68	57288	8292	13363	1812	11176	1625	37938	8135	82340	1.437	1.308	1.357	1.939

GWL/BHO	344	58.89	57792	5188	12951	1819	11203	1625	38894	8204	79087	1.368	1.245	1.292	1.846
BBI/VTZ	361	52.88	68648	5188	13726	1862	11357	1625	38979	8612	81350	1.341	1.221	1.267	1.810
IXC/IXJ	363	52.21	60984	5188	12525	1867	11375	1625	39084	8660	80323	1.317	1.199	1.244	1.777
BLR/COK	378	52.70	62160	5188	13646	1884	11439	1625	39448	8827	82057	1.320	1.201	1.247	1.781
GAU/DIB	382	53.54	64174	5188	13521	1914	11547	1625	40073	9113	82982	1.293	1.177	1.221	1.745
BOM/BDQ	383	53.61	64344	8292	14891	1916	11556	1625	40126	9137	87544	1.361	1.238	1.285	1.836
RPR/IXR	393	54.30	66024	5188	14634	1941	11647	1625	40647	9375	85057	1.288	1.172	1.217	1.738
BLR/IXM	393	54.30	66024	5188	14362	1941	11647	1625	40647	9375	84785	1.284	1.169	1.213	1.733
BOM/RAJ	417	55.97	70056	8292	15880	2001	11864	1625	41897	9948	91507	1.306	1.189	1.234	1.762
IXC/SXR	417	55.97	70056	5188	13782	2001	11864	1625	41897	9948	86305	1.232	1.121	1.164	1.662
KNU/DEL	419	56.11	70392	8292	13941	2006	11882	1625	42001	9996	89743	1.275	1.160	1.204	1.720
IXC/LEH	420	56.18	70560	5188	12830	2009	11891	1625	42053	10020	85615	1.213	1.104	1.146	1.637
IXU/BHO	424	56.46	71232	5188	15414	2018	11927	1625	42262	10115	88550	1.243	1.131	1.174	1.677
DEL/LKO	428	56.74	71904	8292	14137	2028	11964	1625	42470	10210	90727	1.262	1.148	1.192	1.702
IXM/MAA	432	57.02	72576	8292	14941	2038	12000	1625	42678	10306	91880	1.266	1.152	1.196	1.708
BOM/GOI	432	57.02	72576	8292	15070	2038	12000	1625	42678	10306	92010	1.268	1.154	1.197	1.711
BOM/GOA	432	57.02	72576	8292	15070	2038	12000	1625	42678	10306	92010	1.268	1.154	1.197	1.711
CCU/BBI	435	57.23	73080	8292	15445	2046	12027	1625	42835	10377	92647	1.268	1.154	1.197	1.711
DEL/ATQ	443	57.78	74424	8292	14312	2066	12099	1625	43251	10568	92214	1.239	1.128	1.170	1.672
BOM/AMD	454	58.55	76272	8292	16674	2093	12199	1625	43824	10831	95538	1.253	1.140	1.183	1.698
NAG/HYD	461	59.04	77448	5188	17828	2111	12262	1625	44189	10998	94201	1.216	1.107	1.149	1.641
LKO/PAT	461	59.04	77448	5188	15420	2111	12262	1625	44189	10998	91793	1.185	1.079	1.119	1.599
PNQ/AMD	471	59.73	79128	5188	17418	2135	12353	1625	44710	11236	94665	1.196	1.089	1.130	1.614
HYD/PNQ	471	59.73	79128	5188	17672	2135	12353	1625	44710	11236	94919	1.200	1.092	1.133	1.619
CCU/IXB	478	60.22	80804	8292	17263	2153	12416	1625	45075	11403	98227	1.223	1.113	1.155	1.650
CCU/PAT	483	60.57	81144	8292	16736	2165	12461	1625	45335	11522	98138	1.209	1.101	1.142	1.632
BLR/GOA	494	61.33	82992	5188	16371	2193	12561	1625	45908	11785	95631	1.152	1.049	1.088	1.555
BOM/JGA	494	61.33	82992	8292	17686	2193	12561	1625	45908	11785	100049	1.206	1.097	1.139	1.627
DEL/UDR	502	61.89	84336	8292	16152	2213	12633	1625	46325	11976	99216	1.176	1.071	1.111	1.587
HYD/BLR	504	62.03	84672	5188	18055	2218	12651	1625	46429	12023	98189	1.160	1.055	1.095	1.565
CCU/BAU	504	62.03	84672	8292	16999	2218	12651	1625	46429	12023	100237	1.184	1.077	1.118	1.597
MAA/COK	518	63.00	87024	8292	16240	2252	12778	1625	47159	12357	100784	1.157	1.053	1.093	1.561
HYD/VTZ	522	63.28	87696	5188	18653	2262	12814	1625	47367	12453	100362	1.144	1.041	1.081	1.544
BLR/TRV	529	63.77	88872	5188	17278	2280	12878	1625	47732	12620	99599	1.121	1.020	1.058	1.512
MAA/HYD	532	63.98	89376	8292	18062	2287	12905	1625	47888	12691	103750	1.161	1.056	1.096	1.566
CCU/IXS	557	65.72	93576	8292	18433	2349	13131	1625	49190	13208	106308	1.136	1.034	1.073	1.533
IDR/BOM	568	66.48	95424	8292	18453	2377	13230	1625	49763	13550	107291	1.124	1.023	1.062	1.517
BHJ/BOM	578	67.18	97104	8292	19534	2402	13321	1625	50284	13789	109247	1.125	1.024	1.063	1.518
DEL/ALD	583	67.53	97944	8292	17304	2414	13366	1625	50545	13908	107454	1.097	0.998	1.036	1.480
DEL/BHO	589	67.94	98952	8292	17747	2429	13420	1625	50858	14051	108422	1.096	0.997	1.035	1.478
CCU/IMF	597	68.50	100296	8292	19063	2449	13493	1625	51274	14242	110438	1.101	1.002	1.040	1.486
UDR/BOM	597	68.50	100296	8292	19441	2449	13493	1625	51274	14242	110816	1.105	1.005	1.044	1.491
IXU/UDR	608	69.27	102144	5188	19874	2476	13592	1625	51847	14504	109107	1.068	0.972	1.009	1.441
MAA/VTZ	624	70.38	104832	8292	19600	2516	13737	1625	52681	14806	113338	1.081	0.984	1.021	1.459
DEL/IXJ	624	70.38	104832	8292	18321	2516	13737	1625	52681	14806	112059	1.069	0.973	1.010	1.442
JAI/UNS	628	70.66	105504	5188	19226	2526	13773	1625	52889	14982	110210	1.045	0.951	0.987	1.409
MAA/TRV	630	70.80	105840	8292	18766	2531	13791	1625	52993	15029	113028	1.068	0.972	1.009	1.441
UNS/CCU	650	72.19	109200	8292	20137	2581	13972	1625	54035	15506	116149	1.064	0.968	1.005	1.435
GOA/COK	663	73.09	111384	5188	19091	2613	14090	1625	54713	15817	113136	1.016	0.924	0.959	1.370
DEL/UNS	672	73.72	112896	8292	19039	2636	14172	1625	55182	16031	116976	1.036	0.943	0.979	1.398
BOM/HYD	675	73.93	113400	8292	22210	2643	14199	1625	55338	16103	120409	1.062	0.966	1.003	1.433
DEL/LEH	682	74.42	114576	8292	18871	2660	14262	1625	55703	16270	117683	1.027	0.935	0.970	1.386
GOP/DEL	682	74.42	114576	8292	19264	2660	14262	1625	55703	16270	118076	1.031	0.938	0.973	1.390
BOM/NAG	683	74.49	114744	8292	22628	2663	14271	1625	55755	16294	121527	1.059	0.964	1.000	1.429
BBI/NAG	709	76.30	119112	5188	22359	2728	14506	1625	57109	16914	120429	1.011	0.920	0.955	1.364
BOM/IXE	724	77.34	121632	8292	22561	2765	14642	1625	57891	17272	125047	1.028	0.936	0.971	1.387
DEL/SXR	726	77.48	121968	8292	20685	2770	14660	1625	57995	17319	123346	1.011	0.920	0.955	1.364
GOA/AMD	754	79.43	126672	5188	22597	2840	14914	1625	59453	17987	124604	0.984	0.895	0.929	1.327

DEL/AMD	770	80.54	129360	8292	22611	2879	15058	1625	60287	18369	129122	0.998	0.908	0.943	1.347
MNS/BLR	785	81.59	131880	5188	24423	2917	15194	1625	61068	18727	129143	0.979	0.891	0.925	1.321
KNU/AMD	785	81.59	131880	5188	23521	2917	15194	1625	61068	18727	128241	0.972	0.885	0.918	1.312
CCU/KNU	800	82.63	134400	8292	23647	2954	15330	1625	61850	19085	132783	0.988	0.899	0.933	1.333
VTZ/CCU	804	83.05	135400	8292	24899	2969	15384	1625	62163	19228	134560	0.994	0.904	0.939	1.341
CCU/DIB	814	83.74	137088	8292	25244	2994	15475	1625	62683	19464	135782	0.998	0.901	0.935	1.336
BDQ/DEL	845	85.76	141960	8292	24041	3066	15737	1625	64194	20158	137114	0.966	0.879	0.912	1.303
NAG/DEL	859	86.74	144312	8292	25237	3101	15864	1625	64924	20492	139534	0.967	0.880	0.913	1.305
AMD/IXC	868	87.36	145824	5188	25197	3123	15945	1625	65393	20707	137178	0.941	0.856	0.888	1.269
BOM/BLR	870	87.50	146160	8292	25894	3128	15963	1625	65497	20755	141155	0.966	0.879	0.912	1.303
PAT/DEL	889	88.82	149352	8292	24008	3175	16135	1625	66487	21208	140930	0.944	0.859	0.891	1.273
AMD/ATQ	910	90.29	152880	5188	26141	3228	16325	1625	67581	21709	141797	0.928	0.844	0.876	1.251
JAI/BOM	933	91.89	156744	8292	27161	3285	16533	1625	68779	22258	147933	0.944	0.859	0.891	1.273
BOM/CALC	960	93.77	161280	8292	26978	3352	16778	1625	70185	22902	150012	0.930	0.846	0.878	1.255
DEL/RPR	991	95.92	166488	8292	26448	3429	17058	1625	71800	23641	152295	0.915	0.832	0.864	1.234
BOM/CJB	1018	97.80	171024	8292	28520	3496	17303	1625	73207	24285	156732	0.916	0.834	0.866	1.236
BOM/MAA	1074	101.70	180432	8292	29482	3636	17809	1625	76124	25621	162590	0.901	0.820	0.851	1.216
BOM/COK	1095	103.16	183960	8292	29632	3688	17999	1625	77218	26122	164577	0.895	0.814	0.845	1.207
AMD/IXJ	1123	105.11	188664	5188	31386	3758	18253	1625	78677	26790	165677	0.878	0.799	0.829	1.185
BBI/IXZ	1146	106.71	192528	5188	32106	3815	18461	1625	79875	27339	168410	0.875	0.796	0.826	1.180
PAT/AMD	1162	107.83	195216	5188	32459	3855	18606	1625	80709	27721	170162	0.872	0.793	0.823	1.176
BOM/DEL	1190	109.77	199920	11396	31255	3924	18859	1625	82168	28389	177616	0.888	0.808	0.839	1.199
VTZ/DEL	1256	114.37	211008	8292	32885	4089	19456	1625	85606	29963	181916	0.862	0.785	0.814	1.163
BOM/TRV	1274	115.62	214032	8292	33855	4133	19619	1625	86544	30393	184461	0.862	0.784	0.814	1.163
DEL/IXB	1282	116.18	215376	8292	33613	4153	19692	1625	86961	30583	184919	0.859	0.781	0.811	1.158
CCU/HYD	1302	117.57	218736	8292	37582	4203	19873	1625	88003	31061	190638	0.872	0.793	0.823	1.176
CCU/IXZ	1313	118.33	220584	8292	36267	4230	19972	1625	88576	31323	190286	0.863	0.785	0.815	1.164
BLR/AMD	1317	118.61	221256	5188	36888	4240	20008	1625	88784	31418	188152	0.850	0.774	0.803	1.147
DEL/CCU	1318	118.69	221424	11396	34401	4243	20017	1625	88836	31442	191961	0.867	0.789	0.819	1.170
DEL/HYD	1320	118.82	221760	8292	35316	4248	20036	1625	88940	31490	189947	0.857	0.779	0.809	1.156
DEL/FND	1320	118.82	221760	8292	34814	4248	20036	1625	88940	31490	189445	0.854	0.777	0.807	1.153
BOM/VNS	1324	119.10	222432	8292	34787	4258	20072	1625	89149	31585	189767	0.853	0.776	0.806	1.151
DEL/BBI	1346	120.63	226128	8292	33142	4313	20271	1625	90295	32110	190048	0.840	0.765	0.794	1.134
MAA/IXZ	1376	122.72	231168	8292	35836	4387	20542	1625	91858	32826	195367	0.845	0.769	0.798	1.140
CCU/MAA	1432	126.62	240576	11396	37830	4527	21049	1625	94775	34162	205364	0.854	0.777	0.806	1.152
DEL/GAU	1504	131.63	252672	8292	36429	4706	21701	1625	98526	35879	207158	0.820	0.746	0.774	1.106
LKO/BOM	1570	136.22	263760	8292	40532	4870	22298	1625	101964	37454	217035	0.823	0.749	0.777	1.110
DEL/GOA	1627	140.19	273336	8292	38570	5012	22814	1625	104934	38814	220060	0.805	0.733	0.760	1.086
CCU/BLR	1663	142.69	279384	8292	44627	5101	23140	1625	106809	39673	229267	0.821	0.747	0.775	1.107
BOM/CCU	1685	144.23	283080	11396	45302	5156	23339	1625	107956	40197	234971	0.830	0.755	0.784	1.120
DEL/BLR	1748	148.61	293664	8292	43177	5313	23909	1625	111238	41700	235254	0.801	0.729	0.757	1.081
DEL/MAA	1776	150.56	298368	11396	42075	5383	24162	1625	112696	42368	239705	0.803	0.731	0.759	1.084

B737-----SECTOR COST

ANNEXURE II

SECTOR	DIST KMS	BLOCK TIME IN MTS	ASK 1N	LANDING	FUEL COST	CREW	MAINT	HANDLING	CAPITAL COST	COST RLTD TO ASK/RPK	TOTAL COST	COST/ ASK	COST/ASK LESS ALLOW FOR DEAD	AT 70% S.F. WITH COMM (Ks)	RETURN
LKO/KNU	61	23.58	7686	3234	10122	752	3867	1300	1690	1091	22057	2.870	2.612	3.063	4.375
IXS/IMF	93	25.98	11718	3234	11075	829	4041	1300	1867	1664	24005	2.049	1.864	2.186	3.123
JGA/BHJ	100	26.50	12600	3234	12641	846	4079	1300	1900	1789	25788	2.047	1.862	2.184	3.121
MD/BDO	102	26.65	12852	3234	12492	851	4089	1300	1911	1825	25701	2.000	1.820	2.134	3.049
GAU/TEZ	137	29.28	17262	3234	12067	934	4279	1300	2099	2451	26365	1.527	1.390	1.630	2.329
BOM/PNQ	122	28.15	15372	5226	12956	898	4198	1300	2018	2183	28780	1.872	1.704	1.998	2.854
TRZ/IXM	124	28.30	15624	3234	12187	903	4209	1300	2029	2219	26080	1.669	1.519	1.782	2.545
TEZ/JAH	137	29.28	17262	3234	12290	934	4279	1300	2099	2451	26588	1.540	1.402	1.644	2.348
BHO/IDR	167	31.53	21042	3234	13201	1006	4442	1300	2260	2988	28432	1.351	1.230	1.442	2.060
IXJ/SXR	176	32.20	22176	3234	13407	1028	4491	1300	2309	3149	28917	1.304	1.187	1.392	1.988
COK/TRV	180	32.50	22680	3234	13005	1037	4512	1300	2330	3221	28640	1.263	1.149	1.348	1.925
UDR/AMD	188	33.10	23688	3234	14652	1056	4556	1300	2373	3364	30535	1.289	1.173	1.376	1.965
DEL/AGR	206	34.45	25956	5226	13267	1100	4653	1300	2470	3686	31702	1.221	1.111	1.304	1.862
AMD/RAJ	206	34.45	25956	3234	15697	1100	4653	1300	2470	3686	32140	1.238	1.127	1.322	1.888
TRZ/IXJ	213	34.98	26838	3234	14010	1116	4691	1300	2508	3811	30671	1.143	1.040	1.220	1.742
AGR/JAI	219	35.43	27594	3234	14412	1131	4724	1300	2540	3918	31259	1.133	1.031	1.209	1.727
IXA/IXS	220	35.50	27720	3234	14434	1133	4729	1300	2545	3936	31312	1.130	1.028	1.206	1.722
UNS/PAT	224	35.80	28224	3234	14397	1143	4751	1300	2567	4008	31399	1.113	1.012	1.187	1.696
ALD/GDP	224	35.80	28224	3234	14192	1143	4751	1300	2567	4008	31194	1.105	1.006	1.180	1.685
GAU/DMU	243	37.23	30618	3234	14797	1188	4854	1300	2669	4348	32390	1.058	0.963	1.129	1.613
DEL/JAI	246	37.45	30996	5226	14967	1195	4870	1300	2685	4401	34645	1.118	1.017	1.193	1.704
UNS/LKO	246	37.45	30996	3234	14781	1195	4870	1300	2685	4401	32467	1.047	0.953	1.118	1.597
BLR/CALC	251	37.83	31626	3234	15556	1207	4897	1300	2712	4491	33398	1.056	0.961	1.127	1.610
PAT/IXR	254	38.05	32004	3234	15577	1214	4914	1300	2728	4545	33511	1.047	0.953	1.118	1.596
JRH/GAU	259	38.43	32634	3234	15349	1226	4941	1300	2755	4634	33439	1.025	0.932	1.094	1.562
DEL/IXC	261	38.57	32886	5226	14064	1231	4952	1300	2766	4670	34209	1.040	0.947	1.110	1.586
SXR/LEH	263	38.73	33138	3234	15076	1236	4963	1300	2777	4706	34091	1.029	0.936	1.098	1.569
RPR/NAG	283	40.23	35658	3234	17674	1284	5071	1300	2884	5063	36511	1.024	0.932	1.093	1.561
MAA/BLR	272	39.40	34272	5226	16160	1258	5011	1300	2825	4867	36647	1.069	0.973	1.141	1.630
IXZ/CBD	280	40.00	35280	3234	16797	1277	5055	1300	2868	5010	35540	1.007	0.917	1.075	1.536
IXU/BOM	282	40.15	35532	5226	17331	1281	5066	1300	2879	5046	38128	1.073	0.976	1.145	1.636
BHO/HJR	283	40.23	35658	3234	16434	1284	5071	1300	2884	5063	35270	0.989	0.900	1.056	1.508
GAU/IMF	285	40.38	35910	3234	15857	1289	5082	1300	2895	5099	34756	0.968	0.881	1.033	1.476
DEL/GWL	296	41.20	37296	5226	15786	1315	5141	1300	2954	5296	37019	0.993	0.903	1.059	1.513
BHO/NAG	302	41.65	38052	3234	18078	1329	5174	1300	2986	5403	37505	0.986	0.897	1.052	1.503
BLR/IXE	302	41.65	38052	3234	17632	1329	5174	1300	2986	5403	37059	0.974	0.886	1.039	1.485
HJR/UNS	306	41.95	38556	3234	16668	1339	5196	1300	3008	5475	36219	0.939	0.855	1.003	1.432
MAA/TRZ	307	42.03	38682	5226	16688	1341	5201	1300	3013	5493	38263	0.989	0.900	1.056	1.508
JAI/UDR	309	42.18	38934	3234	17534	1346	5212	1300	3024	5529	37178	0.955	0.869	1.019	1.456
IXJ/LEH	314	42.55	39564	3234	16866	1358	5239	1300	3051	5618	36666	0.927	0.843	0.989	1.413
BOM/BHU	319	42.93	40194	5226	18654	1370	5266	1300	3078	5708	40602	1.010	0.919	1.078	1.540
AGR/KHJ	324	43.30	40824	3234	16996	1382	5293	1300	3105	5797	37107	0.909	0.827	0.970	1.386
IXB/GAU	330	43.75	41580	3234	17965	1396	5326	1300	3137	5904	38263	0.920	0.837	0.982	1.403
ATQ/SXR	330	43.75	41580	3234	17208	1396	5326	1300	3137	5904	37505	0.902	0.821	0.963	1.375
IXR/CCU	341	44.57	42966	5226	18606	1423	5385	1300	3196	6101	41238	0.960	0.873	1.024	1.463
CCU/IXA	341	44.57	42966	5226	18298	1423	5385	1300	3196	6101	40930	0.953	0.867	1.017	1.452

GWL/BHO	344	44.80	43344	3234	17724	1430	5402	1300	3212	6155	38457	0.887	0.807	0.947	1.353
BBI/VTZ	361	46.07	45486	3234	18725	1471	5494	1300	3304	6459	39986	0.879	0.800	0.938	1.340
IXC/IXJ	363	46.23	45738	3234	17080	1475	5505	1300	3314	6495	38403	0.840	0.764	0.896	1.280
BLR/COK	370	46.75	46620	3234	18584	1492	5543	1300	3352	6628	40125	0.861	0.783	0.919	1.312
GAU/DIB	382	47.65	48132	3234	18376	1521	5608	1300	3417	6835	40290	0.837	0.762	0.893	1.276
BOM/BDQ	383	47.73	48258	5226	20235	1523	5613	1300	3422	6853	44171	0.915	0.833	0.977	1.396
RPR/IXR	393	48.48	49518	3234	19851	1547	5667	1300	3476	7032	42107	0.850	0.774	0.908	1.296
BLR/IXM	393	48.48	49518	3234	19482	1547	5667	1300	3476	7032	41738	0.843	0.767	0.900	1.285
BOM/RAJ	417	50.28	52542	5226	21457	1605	5798	1300	3605	7461	46451	0.884	0.805	0.944	1.348
IXC/SXR	417	50.28	52542	3234	18623	1605	5798	1300	3605	7461	41625	0.792	0.721	0.846	1.208
KNU/DEL	419	50.43	52794	5226	18832	1609	5808	1300	3615	7497	43888	0.831	0.756	0.887	1.267
IXC/LEH	420	50.50	52920	3234	17328	1612	5814	1300	3621	7515	40423	0.764	0.695	0.815	1.165
IXU/BHO	424	50.80	53424	3234	20806	1621	5836	1300	3642	7586	44025	0.824	0.750	0.879	1.256
DEL/LKO	428	51.10	53928	5226	19071	1631	5857	1300	3664	7658	44407	0.823	0.749	0.879	1.255
IXM/MAA	432	51.40	54432	5226	20142	1641	5879	1300	3685	7729	45603	0.838	0.762	0.894	1.277
BOM/GOI	432	51.40	54432	5226	20317	1641	5879	1300	3685	7729	45777	0.841	0.765	0.898	1.282
BOM/GOA	432	51.40	54432	5226	20317	1641	5879	1300	3685	7729	45777	0.841	0.765	0.898	1.282
CCU/BBI	435	51.63	54810	5226	20813	1648	5895	1300	3702	7783	46366	0.846	0.770	0.903	1.290
DEL/ATQ	443	52.23	55818	5226	19264	1667	5939	1300	3745	7926	45066	0.807	0.735	0.862	1.231
BOM/AMD	454	53.05	57204	5226	22408	1693	5998	1300	3804	8123	48552	0.849	0.772	0.906	1.294
NAG/HYD	461	53.57	58086	3234	23935	1710	6036	1300	3841	8248	48305	0.832	0.757	0.888	1.268
LKO/PAT	461	53.57	58086	3234	20702	1710	6036	1300	3841	8248	45072	0.776	0.706	0.828	1.183
PNQ/AMD	471	54.32	59346	3234	23352	1734	6090	1300	3895	8427	48033	0.809	0.737	0.864	1.234
HYD/PNQ	471	54.32	59346	3234	23692	1734	6090	1300	3895	8427	48373	0.815	0.742	0.870	1.243
CCU/IXB	478	54.85	60228	5226	23123	1751	6128	1300	3933	8552	50013	0.830	0.756	0.886	1.266
CCU/PAT	483	55.23	60858	5226	22403	1763	6155	1300	3960	8642	49448	0.813	0.739	0.867	1.239
BOM/GOA	494	56.05	62244	3234	21883	1789	6215	1300	4019	8839	47278	0.760	0.691	0.811	1.158
BLR/JGA	494	56.05	62244	5226	23640	1789	6215	1300	4019	8839	51027	0.820	0.746	0.875	1.250
DEL/UDR	502	56.65	63252	5226	21568	1808	6258	1300	4062	8982	49204	0.778	0.708	0.830	1.186
HYD/BLR	504	56.80	63504	3234	24103	1813	6269	1300	4073	9018	49810	0.784	0.714	0.837	1.196
CCU/GAU	504	56.80	63504	5226	22693	1813	6269	1300	4073	9018	50392	0.794	0.722	0.847	1.210
MAA/COK	518	57.85	65268	5226	21644	1846	6345	1300	4148	9268	49777	0.763	0.694	0.814	1.163
HYD/VTZ	522	58.15	65772	3234	24847	1856	6367	1300	4169	9340	51113	0.777	0.707	0.829	1.185
BLR/TRV	529	58.68	66654	3234	22996	1873	6405	1300	4207	9465	49480	0.742	0.676	0.792	1.132
MAA/HYD	532	58.96	67032	5226	24032	1880	6421	1300	4223	9519	52601	0.785	0.714	0.837	1.196
CCU/IXS	557	60.78	70182	5226	24457	1940	6557	1300	4358	9966	53803	0.767	0.698	0.818	1.169
IDR/BOM	568	61.60	71568	5226	24454	1966	6616	1300	4417	10163	54142	0.757	0.688	0.807	1.153
BHJ/BOM	578	62.35	72828	5226	25860	1990	6671	1300	4470	10342	55858	0.767	0.698	0.819	1.169
DEL/ALD	583	62.73	73458	5226	22896	2002	6698	1300	4497	10431	53050	0.722	0.657	0.771	1.101
DEL/BHO	589	63.18	74214	5226	23668	2016	6730	1300	4530	10538	53808	0.725	0.660	0.774	1.105
CCU/IMF	597	63.78	75222	5226	25187	2035	6774	1300	4573	10682	55777	0.741	0.675	0.791	1.131
UDR/BOM	597	63.78	75222	5226	25687	2035	6774	1300	4573	10682	56277	0.748	0.681	0.798	1.141
IXU/UDR	608	64.60	76608	3234	26231	2062	6853	1300	4632	10878	55170	0.720	0.655	0.769	1.098
MAA/VTZ	624	65.80	78624	5226	25831	2100	6920	1300	4718	11165	57259	0.728	0.663	0.777	1.110
DEL/IXJ	624	65.80	78624	5226	24145	2100	6920	1300	4718	11165	55574	0.707	0.643	0.754	1.078
JAI/UNS	628	66.10	79128	3234	25328	2110	6942	1300	4739	11236	54889	0.694	0.631	0.740	1.058
MAA/TRV	630	66.25	79380	5226	24717	2114	6953	1300	4750	11272	56332	0.710	0.646	0.757	1.082
UNS/CCU	650	67.75	81900	5226	26475	2162	7061	1300	4858	11630	58712	0.717	0.652	0.765	1.093
GOA/COK	663	68.73	83538	3234	25072	2193	7132	1300	4928	11862	55721	0.667	0.607	0.712	1.017
DEL/UNS	672	69.40	84672	5226	24984	2215	7180	1300	4976	12023	57904	0.684	0.622	0.730	1.043
BOM/HYD	675	69.63	85058	5226	29138	2222	7197	1300	4992	12077	62152	0.731	0.665	0.780	1.114
DEL/LEH	682	70.15	85932	5226	24743	2239	7235	1300	5030	12202	57974	0.675	0.614	0.720	1.029
GOP/DEL	682	70.15	85932	5226	25258	2239	7235	1300	5030	12202	58490	0.681	0.619	0.726	1.038
BOM/NAG	683	70.23	86058	5226	29666	2241	7240	1300	5035	12220	62929	0.731	0.665	0.780	1.115
BBI/NAG	709	72.18	89334	3234	29253	2304	7381	1300	5175	12685	61332	0.687	0.625	0.733	1.047
BOM/IXE	724	73.30	91224	5226	29482	2339	7462	1300	5256	12954	64019	0.782	0.639	0.749	1.070
DEL/SXR	726	73.45	91476	5226	27027	2344	7473	1300	5266	12990	61627	0.674	0.613	0.719	1.027
GOA/AMD	754	75.55	95004	3234	29464	2411	7625	1300	5417	13491	62942	0.663	0.603	0.707	1.010

DEL/AMD	770	76.75	97020	5226	29450	2450	7712	1300	5503	13777	65417	0.674	0.614	0.720	1.020
PNQ/BLR	785	77.88	98910	3234	31778	2486	7793	1300	5584	14845	66219	0.669	0.609	0.715	1.021
KNU/AMD	785	77.88	98910	3234	30604	2486	7793	1300	5584	14845	65845	0.658	0.598	0.702	1.003
CCU/KNU	800	79.00	100800	5226	30736	2521	7874	1300	5664	14314	67636	0.671	0.611	0.716	1.023
VTZ/CCU	806	79.45	101556	5226	32351	2536	7907	1300	5697	14421	69437	0.684	0.622	0.730	1.042
CCU/DIB	816	80.20	102816	5226	32781	2560	7961	1300	5750	14600	70179	0.683	0.621	0.728	1.041
BDQ/DEL	845	82.38	106470	5226	31161	2629	8118	1300	5906	15119	69459	0.652	0.594	0.696	0.995
NAG/DEL	859	83.43	108234	5226	32682	2663	8194	1300	5982	15369	71416	0.660	0.600	0.704	1.006
AMD/IXC	868	84.10	109368	3234	32614	2684	8243	1300	6030	15530	69635	0.637	0.579	0.680	0.971
BOM/BLR	870	84.25	109620	5226	33514	2689	8254	1300	6041	15566	72590	0.662	0.603	0.707	1.010
PAT/DEL	889	85.68	112014	5226	31037	2734	8357	1300	6143	15906	70704	0.631	0.574	0.674	0.962
AMD/ATQ	910	87.25	114660	3234	33756	2785	8471	1300	6256	16282	72083	0.629	0.572	0.671	0.958
JAI/BOM	933	88.98	117558	5226	35030	2840	8596	1300	6380	16693	76064	0.647	0.589	0.691	0.986
BOM/CALC	960	91.00	120960	5226	34617	2904	8742	1300	6525	17176	76490	0.632	0.575	0.675	0.964
DEL/RPR	991	93.33	124866	5226	34012	2979	8910	1300	6691	17731	76849	0.615	0.560	0.657	0.938
BOM/CJB	1018	95.35	128268	5226	36635	3043	9057	1300	6837	18214	80311	0.626	0.570	0.668	0.955
BOM/MAA	1074	99.55	135324	5226	37773	3177	9360	1300	7138	19216	83191	0.615	0.559	0.656	0.937
BOM/COK	1095	101.13	137970	5226	37932	3220	9474	1300	7251	19592	84002	0.609	0.554	0.650	0.928
BOM/IXJ	1123	103.23	141498	3234	40132	3295	9626	1300	7401	20093	85081	0.601	0.547	0.642	0.917
BBI/IXZ	1146	104.95	144396	3234	41017	3350	9751	1300	7525	20504	86681	0.600	0.546	0.641	0.915
PAT/AMD	1162	106.15	146412	3234	41442	3388	9837	1300	7611	20791	87683	0.598	0.544	0.639	0.912
BOM/DEL	1190	108.25	149940	7218	39865	3455	9989	1300	7762	21291	90880	0.606	0.552	0.647	0.924
VTZ/DEL	1256	113.20	158256	5226	41850	3613	10347	1300	8116	22472	92925	0.587	0.534	0.627	0.895
BOM/TRV	1274	114.55	160524	5226	43059	3656	10445	1300	8213	22794	94694	0.590	0.537	0.630	0.899
DEL/IXB	1282	115.15	161532	5226	42740	3675	10488	1300	8256	22938	94623	0.586	0.533	0.625	0.893
CCU/HYD	1302	116.65	164052	5226	47758	3723	10596	1300	8364	23295	100262	0.611	0.556	0.652	0.932
CCU/IXZ	1313	117.48	165438	5226	46071	3749	10656	1300	8423	23492	98918	0.598	0.544	0.638	0.912
BLR/AMD	1317	117.77	165942	3234	46854	3759	10678	1300	8444	23564	97833	0.598	0.537	0.629	0.899
DEL/CCU	1318	117.85	166068	7218	43694	3761	10683	1300	8450	23582	98688	0.594	0.541	0.634	0.906
DEL/HYD	1320	118.00	166320	5226	44853	3766	10694	1300	8461	23617	97917	0.589	0.536	0.628	0.898
DEL/PNQ	1320	118.00	166320	5226	44216	3766	10694	1300	8461	23617	97280	0.585	0.532	0.624	0.892
BOM/VNS	1324	118.30	166824	5226	44176	3776	10716	1300	8482	23689	97364	0.584	0.531	0.623	0.890
DEL/BBI	1346	119.95	169596	5226	42060	3828	10835	1300	8600	24083	95933	0.566	0.515	0.604	0.862
MAA/IXZ	1376	122.20	173376	5226	45440	3900	10998	1300	8762	24619	100245	0.578	0.526	0.617	0.882
CCU/MAA	1432	126.40	180432	7218	47895	4034	11301	1300	9063	25621	106432	0.590	0.537	0.630	0.899
DEL/BAU	1504	131.80	189504	5226	46037	4207	11692	1300	9450	26910	104821	0.553	0.503	0.590	0.843
LKO/BOM	1570	136.75	197820	5226	51142	4365	12050	1300	9805	28090	111978	0.566	0.515	0.604	0.863
DEL/GOA	1627	141.03	205002	5226	48607	4501	12359	1300	10111	29110	111214	0.543	0.494	0.579	0.827
CCU/BLR	1663	143.73	209538	5226	56197	4587	12554	1300	10305	29754	119924	0.572	0.521	0.611	0.873
BOM/CCU	1685	145.38	212310	7218	57022	4640	12673	1300	10423	30148	123425	0.581	0.529	0.620	0.886
DEL/BLR	1748	150.10	220248	5226	54281	4791	13015	1300	10762	31275	120650	0.548	0.498	0.565	0.835
DEL/MAA	1776	152.20	223776	7218	52867	4858	13167	1300	10913	31776	122099	0.546	0.497	0.562	0.832

ANNEXURE III

SECTOR	DIST KMS	BLOCK TIME MTS	ASK IN	LANDING	FUEL COST	CREW	MAINT	HANDLING	CAPITAL COST	COST RLTD TO ASK/RFK	TOTAL COST	COST/ ASK	COST/ASK LESS ALLOW FOR DEAD LOA&RETURN	AT 70% OF WITH COMM (As)	
HYD/BLR	504	60.28	137592	9890	52169	3001	26041	3585	13277	19538	127501	0.927	0.843	0.989	1.413
CCU/GAU	504	60.28	137592	15183	49118	3001	26041	3585	13277	19538	129742	0.943	0.858	1.006	1.438
MAA/COK	518	61.26	141414	15183	46898	3050	26296	3585	13493	20081	128585	0.909	0.827	0.970	1.386
HYD/VTZ	522	61.54	142506	9890	53856	3064	26369	3585	13554	20236	130554	0.916	0.834	0.978	1.397
BLR/TRV	529	62.03	144417	9890	49873	3088	26497	3585	13662	20507	127102	0.880	0.801	0.939	1.342
MAA/HYD	532	62.24	145236	15183	52131	3099	26551	3585	13708	20624	134800	0.929	0.845	0.991	1.416
CCU/IXS	557	63.99	152061	15183	53150	3106	27007	3585	14094	21593	137797	0.906	0.825	0.967	1.382
IDR/BOM	568	64.76	155064	15183	53186	3224	27208	3585	14263	22019	138668	0.894	0.814	0.954	1.363
BHJ/BOM	578	65.46	157794	15183	56282	3259	27390	3585	14418	22407	142523	0.903	0.822	0.964	1.377
DEL/ALD	583	65.81	159159	15183	49849	3276	27482	3585	14495	22601	136470	0.857	0.780	0.915	1.307
DEL/BHO	589	66.23	160797	15183	51115	3297	27591	3585	14587	22833	138191	0.859	0.782	0.917	1.310
CCU/IMF	597	66.79	162981	15183	54889	3325	27737	3585	14710	23143	142572	0.875	0.796	0.934	1.334
UDR/BOM	597	66.79	162981	15183	55979	3325	27737	3585	14710	23143	143662	0.881	0.802	0.941	1.344
IXU/UDR	608	67.56	165984	9890	57203	3363	27938	3585	14880	23570	140429	0.846	0.770	0.903	1.290
MAA/VTZ	624	68.68	170352	15183	56388	3419	28229	3585	15127	24190	146121	0.858	0.781	0.915	1.308
DEL/IXJ	624	68.68	170352	15183	52709	3419	28229	3585	15127	24190	142442	0.836	0.761	0.892	1.275
JAI/UNS	628	68.96	171444	9890	55305	3433	28302	3585	15188	24345	140049	0.817	0.743	0.872	1.245
MAA/TRV	630	69.10	171990	15183	53976	3440	28339	3585	15219	24423	144165	0.838	0.763	0.895	1.278
UNS/CCU	650	70.50	177450	15183	57806	3510	28704	3585	15528	25198	149592	0.843	0.767	0.900	1.285
GOA/COK	663	71.41	180999	9890	54858	3555	28941	3585	15728	25702	142259	0.786	0.715	0.839	1.198
DEL/UNS	672	72.04	183456	15183	54694	3586	29105	3585	15867	26051	148070	0.807	0.734	0.861	1.231
BOM/HYD	675	72.25	184275	15183	63799	3597	29159	3585	15913	26167	157403	0.854	0.777	0.912	1.302
DEL/LEH	682	72.74	186186	15183	54196	3621	29287	3585	16021	26438	148331	0.797	0.725	0.850	1.215
GOP/DEL	682	72.74	186186	15183	55326	3621	29287	3585	16021	26438	149461	0.803	0.731	0.857	1.224
BOM/NAG	683	72.81	186459	15183	64984	3625	29305	3585	16036	26477	159196	0.854	0.777	0.911	1.302
EBI/NAG	709	74.63	193557	9890	64168	3715	29700	3585	16437	27405	155060	0.801	0.729	0.855	1.221
BOM/IXE	724	75.68	197652	15183	64721	3768	30053	3585	16669	28067	162044	0.820	0.746	0.875	1.250
DEL/SXR	726	75.82	198198	15183	59337	3775	30090	3585	16699	28144	156013	0.791	0.720	0.844	1.206
GOA/AMD	754	77.78	205842	9890	64776	3872	30600	3585	17131	29230	159084	0.773	0.703	0.825	1.178
DEL/AMD	770	78.90	210210	15183	64794	3928	30892	3585	17378	29850	165609	0.788	0.717	0.841	1.201
PNQ/BLR	785	79.95	214305	9890	69963	3960	31166	3585	17609	30431	166624	0.778	0.708	0.830	1.185
KNU/AMD	785	79.95	214305	9890	67378	3980	31166	3585	17609	30431	164039	0.765	0.697	0.817	1.167
CCU/KNU	800	81.00	218400	15183	67716	4032	31439	3585	17840	31013	170008	0.782	0.712	0.835	1.192
VTZ/CCU	806	81.42	220038	15183	71292	4053	31549	3585	17933	31245	174039	0.795	0.723	0.848	1.211
CCU/DIB	816	82.12	222768	15183	72271	4088	31731	3585	18087	31633	176578	0.793	0.721	0.846	1.209
BDQ/DEL	845	84.15	230685	15183	68780	4189	32260	3585	18534	32757	175209	0.760	0.691	0.811	1.159
NAG/DEL	859	85.13	234507	15183	72179	4238	32515	3585	18750	33300	179750	0.767	0.698	0.818	1.169
AMD/IXC	868	85.76	236964	9890	72054	4269	32600	3585	18889	33449	175015	0.739	0.672	0.788	1.126
BOM/BLR	870	85.90	237510	15183	74048	4276	32716	3585	18919	33726	182454	0.768	0.699	0.820	1.171
PAT/DEL	889	87.23	242697	15183	68626	4343	33063	3585	19212	34463	178474	0.735	0.669	0.785	1.121
AMD/ATQ	910	88.70	248430	9890	74694	4416	33446	3585	19536	35277	180844	0.728	0.662	0.777	1.110
JAI/BOM	933	90.31	254709	15183	77577	4496	33865	3585	19891	36169	190765	0.749	0.682	0.799	1.142
BOM/CALC	960	92.20	262000	15183	76733	4590	34357	3585	20307	37215	191970	0.732	0.667	0.782	1.117
DEL/RPR	991	94.37	270543	15183	75469	4698	34923	3585	20785	38417	193060	0.714	0.649	0.762	1.080
BOM/CJB	1018	96.26	277914	15183	81357	4792	35415	3585	21201	39464	200997	0.723	0.658	0.772	1.103
BOM/MAA	1074	100.18	293202	15183	84023	4987	36437	3585	22065	41635	207914	0.709	0.645	0.757	1.081

BOM/COK	1095	101.65	298935	15183	84426	5060	36820	3585	22388	42449	209911	0.702	0.639	0.749	1.071
AMD/IXJ	1123	103.61	306579	9890	89389	5158	37330	3585	22820	43534	211707	0.691	0.628	0.737	1.053
BBI/IXZ	1146	105.22	312858	9890	91415	5238	37750	3585	23175	44426	215479	0.689	0.627	0.735	1.050
PAT/AMD	1162	106.34	317226	9890	92400	5294	38042	3585	23421	45046	217678	0.686	0.624	0.732	1.046
BOM/DEL	1190	108.30	324870	20475	88943	5392	38552	3585	23853	46132	226931	0.699	0.634	0.746	1.065
VTZ/DEL	1256	112.92	342888	15183	93513	5622	39756	3585	24871	48690	231219	0.674	0.614	0.720	1.028
BOM/TRV	1274	114.18	347802	15183	96253	5684	40084	3585	25148	49388	235325	0.677	0.616	0.722	1.032
DEL/IXB	1282	114.74	349986	15183	95556	5712	40230	3585	25271	49698	235236	0.672	0.612	0.717	1.025
CCU/HYD	1302	116.14	355446	15183	106819	5782	40595	3585	25580	50473	240016	0.698	0.635	0.745	1.064
CCU/IXZ	1313	116.91	358449	15183	103070	5820	40796	3585	25749	50900	245103	0.684	0.622	0.730	1.043
BLR/AMD	1317	117.19	359541	9890	104830	5834	40869	3585	25811	51055	241874	0.673	0.612	0.718	1.026
DEL/CCU	1318	117.26	359814	20475	97761	5838	40887	3585	25827	51094	245466	0.682	0.621	0.728	1.040
DEL/HYD	1320	117.40	360360	15183	100359	5845	40923	3585	25857	51171	242923	0.674	0.613	0.719	1.028
DEL/PNG	1320	117.40	360360	15183	98933	5845	40923	3585	25857	51171	241497	0.670	0.610	0.715	1.022
BOM/UNS	1324	117.68	361452	15183	98851	5859	40996	3585	25919	51326	241719	0.669	0.609	0.714	1.020
DEL/BBI	1346	119.22	367458	15183	94158	5935	41398	3585	26258	52179	238496	0.650	0.591	0.693	0.990
MAA/IXZ	1376	121.32	375648	15183	101784	6040	41945	3585	26721	53342	248598	0.662	0.602	0.706	1.009
CCU/MAA	1432	125.24	390936	20475	107392	6235	42966	3585	27584	55513	263750	0.675	0.614	0.720	1.029
DEL/GAU	1504	130.28	410592	15183	103353	6486	44279	3585	28694	58304	259884	0.633	0.576	0.676	0.965
LKO/BOM	1570	134.90	428618	15183	114935	6716	45483	3585	29712	60863	276475	0.645	0.587	0.688	0.983
DEL/GOA	1627	138.89	444171	15183	109328	6914	46523	3585	30591	63072	275195	0.620	0.564	0.661	0.945
CCU/BLR	1663	141.41	453999	15183	126465	7040	47179	3585	31146	64468	295065	0.650	0.591	0.694	0.991
BOM/CCU	1685	142.95	460005	20475	128360	7117	47580	3585	31485	65321	303922	0.661	0.601	0.705	1.007
DEL/BLR	1748	147.36	477204	15183	122290	7336	48729	3585	32456	67763	297342	0.623	0.567	0.665	0.950
DEL/MAA	1776	149.32	484848	20475	119147	7434	49240	3585	32888	68848	301617	0.622	0.566	0.664	0.948

5 *Infrastructure Pricing*

Introduction

The terms of reference of the Committee inter alia include the examination of the tariff structure of infrastructure facilities necessary for operation of domestic air carriers. The provision of infrastructure facilities include the following:

- (a) Landing and parking facilities
- (b) Route navigation/communication facilities
- (c) Traffic handling facilities viz., terminal space, heating arrangements, passenger movement/flows.
- (d) Cargo handling facilities
- (e) Engineering facilities

The two public sector agencies which are entrusted with the above functions are the International Airport Authority of India (IAAI) and the National Airport Authority (NAA).

The Agencies

5.2 The IAAI was set up in 1972 under the IAAI Act of 1971 and was entrusted with the task of managing and improving the four international airports at Bombay, Calcutta, Delhi and Madras. The main objectives of the IAAI are:

- (a) To plan, develop, construct and maintain runways, aprons and terminal ancillary buildings at the airports.

- (b) To establish warehouses at the airports for the storage or processing of goods.
- (c) To arrange for postal, money exchange, insurance and telephone facilities for the use of passengers.
- (d) To make appropriate arrangement for watch and ward at the airport.
- (e) To regulate and control the plying of vehicles and the entry and exit of passengers and visitors to the airport.
- (f) To develop and provide consultancy services in India and abroad in relation to planning and development of airports or any other facilities there at.
- (g) To take all other steps as may be necessary or convenient for/or may be incidental to the exercise of any power, or the discharge of any function conferred on it.

5.3 The National Airports Authority was established on June 1, 1986 and is governed by the provisions of NAA Act, 1985. The main objective of forming the Authority was to provide necessary flexibility and autonomy for taking up development activities in the field of civil aviation. The authority is entrusted with the following corporate objectives and functions:

- (a) To manage efficiently the aerodromes, civil enclaves and aeronautical communication stations.
- (b) To provide air traffic service, air safety services and air transport services at any of the specified aerodromes and civil enclaves.
- (c) To develop and provide consultancy services relating to planning and development of airports, air navigation services grounds aids and safety services.
- (d) To perform any function for ensuring the safe and efficient operation of the aircraft across the air space of the nation.

NAA is at present incharge of maintenance and management of 86 civil aerodromes, 29 civil enclaves, 6 defence aerodromes and 5 private aerodromes (the last two for passenger handling only).

Present Basis for Tariff

5.4 The IAAI's tariff for international air traffic is fixed on the basis of bilateral negotiations between IAAI and the International Civil Aviation Organisation (ICAO) and International Air Transport Association (IATA). The ICAO has

provided the following guidelines for determining the tariff. According to the guidelines, where an airport is provided for international use, the users shall ultimately bear the full and fair share of the cost of promoting the airport.

- (a) In determining the cost basis for airport charges the following principles should be applied:
 - (i) The cost to be shared is the full economic cost to the community of providing the airport and its essential ancillary services, including appropriate amounts for interest on capital investment and depreciation of assets as well as the cost of maintenance, operation, management and administration expenses, but allowing for all revenues, aeronautical or non-aeronautical, accruing from the operation of the airport to its operators.
 - (ii) In general, the aircraft operators and other airport users should not be charged for facilities and services they do not use other than those provided for and implemented under the Regional Plan.
 - (iii) Only the cost of those facilities and services in general use by international air services should be included and the cost of facilities of premises exclusively leased or occupied and charged for separately should be excluded.
 - (iv) An allocation of costs should be considered in respect of space or facilities utilised by Government authorities.
 - (v) The proportion of costs allocable to various categories of users, including State aircraft, should be determined on an equitable basis, so that no users shall be burdened with costs not properly allocable to them according to sound accounting principles.
 - (vi) Costs related to the provision of approach and aerodrome control should be separately identified.
 - (vii) Under favourable circumstances airports may produce sufficient revenues to exceed by a reasonable margin all direct and indirect costs (including general administration, etc.) and so provide for retirement of debt and reserves for future capital improvements.
 - (viii) The users capacity to pay should not be taken into account until all costs are fully assessed and distributed on an objective basis. At that stage, the contributing capability of States and communities concerned should be taken into consideration, it being understood that any State or charging authority may recover less than its full costs in recognition of local, regional, or national benefits received.

- (b) Charging systems at international airports should be chosen in accordance with the following principles:
- (i) Any charging system should, so far as possible, be simple and suitable for general application at international airports.
 - (ii) Charges should not be imposed in such a way as to discourage the use of facilities and services necessary for safety.
 - (iii) The charges must be non-discriminatory both between foreign users and those having the nationality of the state of the airport and engaged in similar international operations, and between two or more foreign users.
 - (iv) Where any preferential charges, special rebates, or other kinds of reduction in the charges normally payable in respect of airport facilities are extended to particular categories of users, Governments should ensure, so far as practicable, that any resultant under-recovery of costs properly allocable to the users concerned is not passed on to other users.
- (c) The Council recommends that Governments and airport authorities should consider inclusion of the following factors when establishing airport charging methods at international airports:
- (i) Landing charges should be based on the weight formula, using the maximum permissible take-off weight as indicated in the certificate of airworthiness or other prescribed document as the basis for assessment.
 - (ii) The landing charge scale should be based on a constant rate per 1,000 kgs. or pounds in weight, but the rate may be varied at a certain level or levels of weight if considered necessary.
 - (iii) Where charges for approach and aerodrome control are levied as part of the landing fee or separately, these could take aircraft weight into account but less than in direct proportion.
 - (iv) No differentiation in rates should be applied for international flights because of the stage length flown.
 - (v) A single charge should be applied for costs of as many airport provided facilities and services for normal landing and take-off of aircraft as possible (generally excluding hangars and certain terminal building and other facilities as are normally handled by leases or other usual commercial practices).

- (vi) Where restrictions on aircraft payload are imposed by airport limitations, consideration should be given locally to adjusting the landing charge indicated by the weight scale in cases where the restrictions are of a severe and long lasting nature.
- (vii) The period of free parking time for aircraft immediately following landing should be determined locally by considering aircraft scheduling, space availability and other pertinent factors.
- (viii) For the determination of charges associated with the use of parking, hangar and long term storage of aircraft, maximum permissible take-off weight and/or aircraft dimensions (area occupied) should be used, so far as possible, as the basis.
- (ix) Where charges are levied by different authorities at an airport, they should, so far as possible, be consolidated into a single charge or a very small number of different charges, the combined revenues being distributed among the authorities concerned in a suitable way.
- (x) The ordinary landing charge should cover the use of lights and special radio aids for landing where these are required, since it is in the interest of safety that aircraft operators should not be discouraged from utilising aids by the imposition of separate charges for their use. If separate charges are made for facilities of this kind, they should not be levied on the basis of optional use but should be uniformly imposed on all landings occurring during periods established by the airport operators.
- (xi) Maximum flexibility should be maintained in the application of all charging methods to permit introduction of improved techniques as they are developed.
- (xii) Airport charges levied on international general aviation, although needing to respect article 15 of the Chicago convention, should be assessed in a reasonable manner, having regard to the cost of the facilities needed and used and the goal of encouraging the growth of international general aviation.

Tariff for Domestic Flights

5.5 In so far as the flights other than international are concerned the tariff is lower than that applicable to international traffic, as some of the items of expenditure are not incurred for management of domestic air traffic. The rates for domestic movements form about three fourth of the international rates. Tables 5.1 and

5.2 give the tariff for landing and hiring charges for international and domestic flights.

Table 5.1

International Airports Authority of India	
Landing Charges	
Total weight	Rates w.e.f. midnight of 31st March, 1988/1st April, 1988 Landing charges per single landing
<u>International flights</u>	
Not exceeding 10,000 Kgs.	Rs. 39.50 (\$2.43) per 1000 Kgs.
Over 10,000 Kgs. but not exceeding 20,000 Kgs.	Rs. 395.00 (\$ 24.31) plus Rs. 58.80 per 1000 Kgs. in excess of 10,000 Kgs.
Over 20,000 Kgs. but not exceeding 50,000 Kgs.	Rs. 983.00 (\$ 60.49) plus Rs. 117.10 (\$ 7.23) per 1000 Kgs. in excess of 20,000 Kgs.
Over 50,000 Kgs. but not exceeding 100,000 Kgs.	Rs. 4509.50 (\$ 277.50) plus Rs. 137.10 (\$ 8.44) per 1000 Kgs. in excess of 50,000 Kgs.
Over 100,000 Kgs.	Rs. 11,364.50 (\$ 699.35) plus Rs. 156.55 (\$ 9.63) per 1000 Kgs. in excess of 100,000 Kgs.
<u>Flights other than international flights</u>	
Not exceeding 10,000 Kgs.	Rs. 29.65 (\$ 1.82) per 1000 Kgs.
Over 10,000 Kgs. but not exceeding 20,000 Kgs.	Rs. 296.50 (\$ 18.25) plus Rs. 44.00 (\$ 2.71) per 1000 Kgs. in excess of 10,000 Kgs.
Over 20,000 Kgs. but not exceeding 50,000 Kgs.	Rs. 737.50 (\$ 45.38) plus Rs. 88.15 (\$ 5.42) per 1000 Kgs. in excess of 20,000 Kgs.
Over 50,000 Kgs. but not exceeding 100,000 Kgs.	Rs. 3,382.00 (\$ 208.12) plus Rs. 102.85 (\$6.33) per 1000 Kgs. in excess of 50,000 Kgs.
Over 100,000 Kgs.	Rs. 8,524.50 (\$ 524.58) plus Rs. 117.40 (\$7.12) per 1000 Kgs. in excess of 100,000 Kgs.

- Notes: 1. Charges shall be calculated on the basis of nearest 1000 Kgs.
 2. Landing charges for each aircraft shall be rounded off to the nearest rupee.
 3. A minimum fee of Rs. 100 (\$ 6.15) shall be charged per single landing.
 4. A surcharge of 25 per cent will be levied on landing charges for supersonic aircraft.
 (Conversion rate applied is 1 US \$ = Rs. 16.25 prevalent as on 19.7.1989)

Table 5.2

International Airports Authority of India Housing Charges	
Total weight	Rates w.e.f. midnight of 31st March, 1988/1st April, 1988
<u>International flights</u>	
Upto 40,000 Kgs.	Rs. 1.35 (\$0.08) per hour per 1000 Kgs.
Over 40,000 Kgs. but not exceeding 100,000 Kgs.	Rs. 54.00 (\$3.32) plus Rs. 2.65 (\$0.16) per hour per 1000 Kgs. in excess of 40,000 Kgs.
Over 100,000 Kgs.	Rs. 0.65 (\$13.11) plus Rs. 4.05 (\$0.25) per hour per 1000 Kgs. in excess of 100,000 Kgs.
<u>Flights other than International flights</u>	
Upto 20,000 Kgs.	Rs. 0.65 (\$0.04) per hour per 1000 Kgs.
Over 20,000 Kgs. but not exceeding 40,000 Kgs.	Rs. 13.00 (\$0.80) plus Rs. 1.35 (\$0.08) per hour per 1000 Kgs. in excess of 20,000 Kgs.
Over 40,000 Kgs. but not exceeding 100,000 Kgs.	Rs. 40.00 (\$2.46) plus Rs. 2.66 (\$0.16) per hour per 1000 Kgs. in excess of 40,000 Kgs.
Over 100,000 Kgs.	Rs. 199.00 (\$12.55) plus Rs. 4.05 (\$0.25) per 100 Kgs. in excess of 100,000 Kgs.

Notes

1. While calculating free parking period, standard time of 15 minutes shall be added on account of time taken between touch down time and actual parking time on the parking stand. Another standard time of 15 minutes shall be added on account of taxiing time of aircraft from parking stand to take off point. These periods shall be applicable for each aircraft irrespective of actual time taken in the movement of aircraft after landing or before take off.
2. For calculating chargeable parking time, part of an hour shall be rounded off to the nearest hour.
3. Charges shall be calculated on the basis of nearest 1000 Kgs.
4. Charges for each period of parking shall be rounded off to the nearest rupee.
5. At the in-contact stands, after free parking, normal parking charges shall be levied for the next two hours. After this period, the charges shall be double the normal parking fee.

(Conversion rate applied at Rs. 16.25 prevalent as on 19.7.1989)

Parking Charges

- 5.6 Where an aircraft is parked in the open only half the housing charges specified above shall be levied. No parking charges shall however be levied for the first two hours.

At the four international airports managed by IAAI, NAA is providing ATC/COM facilities and enroute and terminal navigation facilities for which the Authority collects Route Navigation Facility Charges (RNFC) and Terminal Navigation Landing Charges (TNLC) from foreign as well as domestic operators. The rates of landing charges at the domestic airports and civil enclaves are given in Table 5.3.

Table 5.3

Rates of Landing Charges at Domestic Airports/Civil Enclaves	
<u>International flights</u>	
Not exceeding 10,000 Kgs.	Rs. 31.00 per 1,000 Kgs.
Over 10,000 Kgs. but not exceeding 20,000 Kgs.	Rs. 310.00 plus Rs. 46.00 per 1000 Kgs. in excess of 10,000 Kgs.
Over 20,000 Kgs. but not exceeding 50,000 Kgs.	Rs. 770.00 plus Rs. 92.00 per 1000 Kgs. in excess of 20,000 Kgs.
Over 50,000 Kgs. but not exceeding 100,000 Kgs.	Rs. 3,530.00 plus Rs. 107.00 per 1000 Kgs. in excess of 50,000 Kgs.
Over 100,000 Kgs.	Rs. 8,880.00 plus Rs. 122.00 per 1000 Kgs. in excess of 100,000 Kgs.
<u>Flights other than international flights</u>	
Not exceeding 10,000 Kgs.	Rs. 17.00 per 1000 Kgs.
Over 10,000 Kgs. but not exceeding of 20,000 Kgs.	Rs. 170.00 plus Rs. 30.00 per 1000 Kgs. in excess of 10,000 Kgs.
Over 20,000 Kgs.	Rs. 470.00 plus Rs. 60.00 per 1,000 Kgs. in excess of 20,000 Kgs.
<u>Terminal Navigation Landing Charges at Bombay/Calcutta/Delhi/Madras</u>	
Upto 10,000 Kgs.	Rs. 250.00 (US \$ 19.00)
Exceeding 10,000 Kgs.	Rs. 1350.00 (US \$ 104.00)

- 5.8 However, as per directions of the Government, Vayudoot has been allowed to be charged at a concessional rate of 50 per cent of the rates for the period ending 31st March, 1989.

**Terminal Navigation Landing Charges (TNLC)
at Bombay/Calcutta/Delhi/Madras**

- 5.9 These charges which have been levied from 1st April, 1988 relate to the provision of air traffic/communication facilities by NAA at the four international airports at the final phase of landing and take-off of aircraft. These charges are directly collected by NAA from the operators. Prior to 1st April, 1988, these charges were a part of landing charges collected by IAAI and NAA were reimbursed share of the revenue collected. Vayudoot has been given concessional charges at 50 per cent for aircraft exceeding 10,000 Kgs. Casual/non-scheduled foreign airlines are required to pay these charges in US Dollars. According to NAA, the TNLC charges introduced from 1st April, 1988 are awaiting ex-post-factor approval of the Government.

Route Navigation Facility Charges (RNFC)

- 5.10 Apart from landing charges, aircraft over-flying the territory of India and landing at international airports as well as domestic airports/civil enclaves are required to pay route navigation facilities charges. A comparative table showing the rates charged by NAA for route navigation facilities charges, terminal navigation landing charges/landing charges for representative aircraft is given in Table 5.4.

Table 5.4

Current Rates Per Single landing of Aircraft as on 1st March, 1989							(In Rupees)
International Airports Authority of India (Bombay/Calcutta/Delhi/Madras)				National Airports Authority (Domestic Airports)			Remarks
Landing Charges	International Flights	IA	Vayudoot at 50 per cent of rates applicable for IA	International Flights	IA	Vayudoot at 50 per cent of rates applicable for IA	
B-747	46119	-	-	-	-	-	
Airbus (15000 Kgs.)	19192	14125	-	14980	8270	-	IA paying only at 58 per cent of IAAI rates
B-737 (50000 Kgs.)	4510	3382	-	3530	2270	-	IA paying at 67 per cent of IAAI rates
HS-748 (21000 Kgs.)	-	826	413	-	530	265	IA paying at 64 per cent of IAAI rates
F-27 (20000 Kgs.)	-	738	369	-	470	235	IA paying at 64 per cent of IAAI rates
Dornier (5000 Kgs.)	-	150	76	-	-	42.50	
R.N.F.C.							
B-747	8100	8100	-	-	-	-	
Airbus	5670	5670	-	2100	2100	-	IA Paying at 37 per cent of charges paid at
B-737	2280	2280	-	844	844	-	-do-
HS-748	1267	1267	635	469	469	235	-do-
F-27	1267	1267	635	469	469	235	-do-
Dornier	-	-	50	-	-	18.75	
T.N.L.C.							
Upto 10000 Kgs.	US \$ 19	Rs. 250	Rs. 250	-	-	-	
Over 10000 Kgs.	US \$ 104	Rs. 1350	Rs. 675	-	-	-	

Impact on Operating Cost of Airlines

5.11 The Committee studied the impact of infrastructural facilities charges on the domestic operating cost of Indian Airlines and noted that the facility charges as percentage of operating cost of airlines has increased over time. Table 5.5 indicates this share of charges in the operating cost.

Table 5.5

Aircraft Landing, Housing and Parking Fees and Route Navigation Charges (Rupees in crores)					
Year	Landing, housing and parking fees	Route navigation charges	Total airport charges	Total operating expenses	Percentage of total airport charges to total operating expenses
1970-71	1.21	—	1.21	46.49	2.6
1971-72	1.52	—	1.52	57.11	2.7
1972-73	1.83	—	1.83	67.19	2.7
1973-74	1.41	—	1.41	66.01	2.1
1974-75	1.65	—	1.65	93.07	1.8
1975-76	2.01	—	2.01	97.94	2.1
1976-77	2.61	0.64	3.25	107.35	3.0
1977-78	5.03	3.96	8.99	127.96	7.0
1978-79	5.82	4.42	10.24	155.92	6.6
1979-80	6.72	4.32	11.04	191.40	5.8
1980-81	9.12	4.77	13.89	265.55	5.2
1981-82	12.60	5.06	17.66	327.99	5.4
1982-83	17.67	6.90	24.57	389.35	6.3
1983-84	19.30	8.98	28.28	446.06	6.3
1984-85	22.76	9.96	32.72	503.81	6.5
1985-86	26.67	10.81	37.48	613.39	6.1
1986-87	33.00	16.94	49.94	719.75	6.9
1987-88	46.45	17.52	62.97	810.98	7.8

5.12 It may be seen that though the percentage of facilities charges to operating cost has increased from 2.6 per cent in 1970-71 to 7.8 per cent in 1987-88, the increase has been partly due to the imposition of route navigation charges since 1976-77 and partly due to the increase in landing, housing and parking charges.

Comments on the Existing Tariff

- 5.13 The present policy of determining the tariff for landing charges based on negotiations with IATA may continue as a sizeable revenue is realised from international flights. IAAI may examine the feasibility of introducing separate tariff for peak hour/peak season/night and off periods and apron terminal and conveyer belt charges as is the practice in some developed countries.
- 5.14 Since Bombay and Delhi airport are facing congestion, it would be desirable to introduce time of day pricing in these airports.

The present tariff of IAAI provides considerable surplus of revenue which should be utilised for development of airport facilities. NAA is not generating the required surplus for meeting expenses towards development of domestic airports. In order that the surplus funds of IAAI are properly utilised for development of airport facilities throughout the country, the Committee recommends that the two agencies IAAI and NAA should be brought under a single apex organisation, namely, a holding company called "Airport Authority of India" under which the IAAI and NAA should be constituted as subsidiary companies. This arrangement would facilitate the availability of greater resources from the surplus of IAAI to NAA for an overall and balanced development of all the airports throughout the country.

- 5.15 The tariff charged by the NAA does not appear to be based on a detailed analysis of costs and some element of adhocism cannot be ruled out. Since adequate data for the input costs was not readily available, this aspect could not be studied by the Committee. It is essential that NAA conducts a cost benefit analysis keeping in view, the social costs involved and submit a paper to the Ministry of Civil Aviation and Planning Commission. The future increases on tariff should be based on this study. There is an imperative need to upgrade facilities at domestic airports which are now to deal with technologically advanced aircrafts as also the growing volume of traffic. This would require substantial investments. In this context it is recommended that customs duty on imported capital equipment needed for upgrading the infrastructure be reduced from to 25 per cent advalorem.

6 *Tariff for Passenger Services*

Introduction

- 6.1 The main task of this Committee is to recommend a rational framework for revision of air fares, keeping in view service and other considerations. A conceptual framework for pricing airline services has been developed in chapter 3 and costing of domestic airline services discussed in chapter 4. The merits of the LRMC exercise for the preferred modern aircraft A-320 are that (a) it links investment planning and costing; (b) the resulting fares are based on technically feasible norms and are independent of Indian Airlines' actual costs and hence the resultant prices are incentive compatible; and (c) the enterprise is financially viable as the required capital costs are provided for recovery. These merits as well as the various distortions observed in the present tariff structure highlighted in chapter 2 justify the need for adopting a LRMC based tariff for the airline passenger services. However, in determining the tariff, it is desirable to take into account (a) the relationship between LRMC's and the actual tariff to facilitate price adjustments in a phased manner, if necessary; (b) consumers' choice among alternative modes of transport; (c) value of service; and (d) social goals.
- 6.2 Section 2 of this chapter considers the two LRMC estimates (based on block and plane hours) for A-320 and the actual cost estimates for the two existing aircrafts, AB-300 and B-737, and their relationships to the economy class air fares. It recommends a switchover to LRMC based tariff in a phased manner. The proposed fares for the economy class for 1989-90 are compared with the

railways AC 1st class fares for a few sectors. Section 3 provides guidelines for the determination of the executive class fares and the extent of concessions for the certain classes of passengers and certain types of services. It stresses the need for developing appropriate policies to ensure better utilisation of aircrafts throughout the year. Section 4 suggests procedures for revision of tariffs. Section 5 suggests two schemes for improving quality of airline services.

Present Tariff, the Cost Estimates and the Proposed Tariff

Present Tariff and Cost per Km.

- 6.3 Comparison of the tariff for the economy class, as on 1st September, 1989, with the LRMC's for A-320 and the actual costs for AB-300 and B-737 is given in Table 6.1. It may be observed that the telescoping of costs, at 70 per cent seat factor, between the shortest and the longest distance slabs is sharpest in the case of LRMC estimates for A-320, based on plane hours. The cost for 1701-1800 kms. slab is about one-sixth of the cost for 1-100 kms. slab. The corresponding orders of magnitudes are about two-eleventh for LRMC for A-320, based on its actual cost of operation. Compared with these magnitudes, it is obvious that the telescoping of fares as on 1st September, 1989 is not sharp i.e. the order of magnitude is only 0.52.
- 6.4 It may be seen from Figure 6.1 that the existing fare curve lies below the average LRMC Curve. The erratic behaviour of the fare curve is due to the fact that in many sectors the present fares are not realigned with the current PDR distances.

Table 6.1

Comparison of A-320, AB-300 and B-737 costs at 70 per cent seat factor and 2850 block hours of utilisation (at 1989-90 prices) with existing fares (Rs./Passenger Km.)						
Distance Slab (kms.)	LRMC		Average	Actual Costs		Tariff As on 1.9.1989
	PH A-320	BH A-320		AB-300	B-737	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1-100	5.820	4.839	5.330	-	3.423	1.88
101-200	3.656	3.160	3.408	-	2.270	1.56
201-300	2.467	2.236	2.352	-	1.627	1.43
301-400	2.012	1.881	1.947	-	1.392	1.21
401-500	1.726	1.663	1.695	-	1.249	1.19
501-600	1.553	1.529	1.541	1.371	1.158	1.13
601-700	1.415	1.419	1.417	1.262	1.072	1.11
701-800	1.320	1.344	1.332	1.200	1.028	1.10
801-900	1.266	1.304	1.285	1.166	1.003	1.09
901-1000	1.204	1.253	1.229	1.114	0.962	1.10
1001-1100	1.159	1.219	1.189	1.084	0.940	1.02
1101-1200	1.118	1.185	1.152	1.054	0.917	1.02
1201-1300	1.086	1.161	1.124	1.028	0.896	1.04
1301-1400	1.076	1.154	1.115	1.027	0.897	1.06
1401-1500	1.068	1.152	1.110	1.029	0.899	1.02
1501-1600	1.020	1.108	1.064	0.974	0.853	1.04
1601-1700	1.012	1.105	1.059	0.981	0.862	0.98
1701-1800	0.986	1.082	1.034	0.949	0.834	0.98
1801 and more	-	0.98	-	-	-	0.98

PH: Plane Hours = Block Hours + Loading and Unloading Time

6.5 The present fares are below the average actual costs for B-737 aircrafts in use for distances upto 600 kms. but they are above the average costs of these aircrafts for distances exceeding 600 kms. Comparison of the present fares with the average costs for AB-300 shows that the fares are generally below the actual costs for distances from 500 kms. to 1200 kms. but the fares are above the costs for distances beyond 1200 kms.

6.6 The weighted cost per ASKkm at 70 per cent seat factor depends on the fleet mix. The fleet mix of Indian Airlines (excluding turbo-prop) as on 1st September, 1989, 1st April, 1990 and 31st March, 1995 is given below:

Aircraft	As on 1.9.1989	As on 1.4.1990	As on 31.3.1995 ^(a)
Airbus 300	11 ^(b)	10	10
Boeing 737	30 ^(c)	24	17
Airbus 320	5	19	31
+100 Seater	-	-	20
+150 Seater	-	-	6
+300 Seater	-	-	7

(a) Based on 11.5 per cent hypothetical growth rate

(b) Includes one aircraft on lease

(c) Includes six aircrafts on lease

Assuming 11 Airbus 300, 30 Boeing 737 and 8 Airbus 320 (based on the induction plan) aircraft capacities, in terms of ASKMs, available for 1989-90, the shares of these three aircrafts in the total ASKMs for 1989-90 are 0.370, 0.485 and 0.165 respectively.

Proposed Tariff

6.7 For each sector, the fare can be determined on the basis of (1) LRMC based on plane hours, (2) LRMC based on block hours or (3) an average of (1) and (2). The reason for adoption of method (3) is that while the depreciation component of capital cost varies largely with block hours, the other components of capital cost vary mainly with plane hours. Whichever method is adopted, two problems will arise. The first problem is that it would result in steep increases in short (upto 500 kms.) and medium (501 to 800 kms.) haul fares. The second problem is that as the weighted cost per km. for all the fleets in operation is considerably lower than the cost per km. for A-320, a tariff based on LRMC of A-320 will generate surplus revenues during the transition period i.e. till the old aircrafts are phased out. Hence, the Committee favours a shift to LRMC based pricing in short haul sectors in a phased manner and also restriction to maximum increase in 1994-95 to 50 per cent. It recommends LRMC based pricing for long haul sectors immediately, as the differences

between the average LRMCs and the existing fares are not large. In determining the fares, the Committee also considered the need for smoothening out the taper.

- 6.8 The method of determining the fares for the different distance slabs for 1989-90, the terminal year of Seventh Five Year Plan, and for 1994-95, the terminal year of Eighth Five Year Plan, is as follows. The fares are based on 1989-90 prices. For distances above 700 kms. the Committee recommends that a simple average of the two LRMC's for A-320 given in columns (2) and (3) of Table 6.1 i.e. method 3 mentioned in para 6.7 above may be adopted for 1989-90 as well as 1994-95. The resulting fare increases are in the range of 12 per cent to 20 per cent for the distance slabs in the category of 701 kms. to 1200 kms. and of less than 10 per cent for the distance slabs in the category with distance above 1200 kms. For distances exceeding 1800 kms the fare may be calculated at the rate of Rs. 1.00 per km. uniformly.
- 6.9 It was noted that the landing and handling costs are fixed and are independent of the distances flown. Also, fuel and direct aircraft maintenance costs have constant components. Therefore, it was considered desirable to have a minimum fare for air travel (minimum fares do exist in railways for different passenger services). The Committee recommends a minimum fare of Rs. 200 for 1989-90 for sectors with air distances of 100 kms. or less. Even this minimum fare for the first slab is less than the actual average cost of the least unit cost aircraft Boeing 737. It may be seen from Fig. 7.3 of chapter 7 that the variable cost of 70 per cent seat factor for a sector distance of 100 kms. works out to Rs. 200. This minimum fare may be raised to Rs. 250 by 1994-95.
- 6.10 For the second slab i.e. 101-200 kms., the LRMC is Rs. 3.41. As this would involve an increase of 118 per cent, it is recommended that it should be raised to Rs. 2.27 covering at least actual unit cost of operations of Boeing 737 by 1994-95. However, for 1989-90, it is recommended that the rate per km. be raised to Rs. 2.00. For the distance slabs 201-300 and 301-400 also, it may not be feasible to increase the rates to average LRMC levels, as this would mean more than 60 per cent increase in the existing fares. Therefore, the Committee recommends an increase of 40 per cent and 49 per cent for the third and fourth slabs respectively by 1994-95. However, for 1989-90 the recommended increase will be 25 per cent of the existing fare for both the slabs. For the distance slabs falling between 401-500 and 601-700, it is feasible to raise the rates to the average LRMC by 1994-95. However, for 1989-90, the Committee recommends 20 per cent increase in the existing fares for these slabs. The

proposed increases in passenger fares for 1989-90 and 1994-95 alongwith the existing fares and percentage increases in the proposed fares (compared with the existing fares) are given in Table 6.2. The proposed fare curves are drawn in Fig. 6.2. The fare for any sector can be estimated from the fare curve of Fig. 6.2.

- 6.11 The proposed fares for 1989-90 require increases in the fares in the range of 20 per cent to 28 per cent for distances upto 800 kms., of 13 per cent to 18 per cent for distances between 801 kms. and 1200 kms. and of 2 per cent to 8 per cent for distances above 1200 kms.

Table 6.2

Existing and Proposed Passenger Fares at 1989-90 Prices					
(Rs./Passenger Km)					
Distance Slab (kms.)	Existing Fare Rs.	Proposed Fares			
		1989-90		1994-95	
		Rs.	% increase over (2)	Rs.	% increase over (3)
(1)	(2)	(3)	(4)	(5)	(6)
1-100	1.88	Min. 200	-	Min 250	-
101-200	1.56	2.00	28	2.27	46
201-300	1.43	1.79	25	2.07	40
301-400	1.21	1.51	25	1.80	49
401-500	1.19	1.43	20	1.70	43
501-600	1.13	1.36	20	1.54	36
601-700	1.11	1.33	20	1.42	28
701-800	1.10	1.33	20	1.33	20
801-900	1.09	1.29	18	1.29	18
901-1000	1.10	1.23	12	1.23	12
1001-1100	1.02	1.19	17	1.19	17
1101-1200	1.02	1.15	13	1.15	13
1201-1300	1.04	1.12	8	1.12	8
1301-1400	1.06	1.12	6	1.12	6
1401-1500	1.02	1.11	9	1.11	9
1501-1600	1.04	1.06	2	1.06	2
1601-1700	0.98	1.06	8	1.06	8
1701-1800	0.98	1.03	5	1.03	5
1801 and more	-	1.00	-	1.00	-

These fare increases are necessary not only to reduce gaps between LRMCs and the existing fares but also to encourage development of good surface transportation facilities.

Relation to Railway AC First Class Fares

- 6.12 It is worth comparing the railway AC first class fares with the air fares proposed for 1989-90. In comparing the fares, it should be noted that for many sectors in the western region, the railway sectoral distances are far greater than the air distances because the train routes are circuitous. As a result, even though the air fare per km. is higher than the railway fare per km. in every distance slab, the railway fare could be higher than the air fare. The proposed taper for the economy class would make air travel a little costlier except in a few sectors where the train routes are circuitous.
- 6.13 Comparison of railway AC first class fares with air fares, as on 1st September, 1989, and the proposed air fares is given in Table 6.3. For sectors like Madras-Hyderabad, Madras-Trivandrum, Bombay-Delhi and Bombay-Mangalore the fares received by Indian Airlines are below the AC first class fares, but the fares paid by the travellers (total fare + passenger service fee and Indian Airlines Travel Tax (IATT)) are higher than the corresponding railway fares. After revision the air fares for Bombay-Mangalore will still be lower than the corresponding railway fare.

Table 6.3

Comparative Railway AC I Class Fares and Air Fares as on 1st September, 1989 and proposed Air Fares for 1989-90 (In Rupees)				
Sectors	Railway AC I Class Fare	Air Fare as on 1.9.89		Proposed Fare for 1989-90 (Excluding PSF & IATT)
		Fare	Fare including (PSF & IATT)	
(1)	(2)	(3)	(4)	(5)
Bombay-Pune	204	205	230	244
Delhi-Gwalior	306	400	440	530
Ahmedabad-Bombay	439	550	601	649
Delhi-Bhopal	569	670	728	801
Madras-Hyderabad	636	610	663	724
Madras-Trivandrum	718	695	754	838
Bombay-Bangalore	866	935	1011	1122
Delhi-Vadodara	1030	935	1011	1090
Bombay-Calicut	1176	1030	1113	1181
Delhi-Gauhati	1213	1575	1696	1594
Bombay-Mangalore	1286	800	867	963
Bombay-Delhi	1295	1220	1316	1369
Delhi-Calcutta	1320	1385	1492	1476

PSF : Passenger Service Fare

IATT : Indian Airlines Travel Tax

Other Related Issues

Executive Class Fares

6.14 At present the executive class is available only in Airbus 300. Until recently, the executive class fares were 1.2 times the economy class fares. Presently, the executive class fares are 30 per cent above the fares for the economy class. It is estimated that the cost of a seat in the executive class is about 15 per cent higher than the cost of a seat in the economy class. The higher mark-up of 30 per cent can be justified on the basis of the value of service principle and the higher seat factor experienced in the executive class, indicative of the growing demand for this class.

Concessions

- 6.15 The Committee reviewed various special fares being offered by the Indian Airlines. Special fares listed in chapter 2 can be classified under three broad categories viz., humanitarian, concessional and related to tourism.
- 6.16 Special fares given on humanitarian considerations include fares for blind people, cancer patients and stretcher cases. Since the utilisation of these fares and their financial impact is very small, they may be continued by the Indian Airlines. However, no fresh categories of passengers should be extended the facility of special fares on humanitarian considerations or other non-commercial grounds viz., social, cultural, welfare, etc. as a large number of such demands would arise and it will be difficult to meet them. The special fares under the category 'concessional' include special fares for armed forces, students and accompanying teachers, etc. It is felt that special fares for students and accompanying teachers imply subsidy to those who can afford to pay and, as such, the subsidy can by no means be justified on grounds of equity. Therefore, there is every case for its review and withdrawal. As far as concession to the Armed Forces is concerned, the concessions may continue on the basis of a specific directive by the Government.

The tourism related fares include fares like Discover India Fare, India Wonder Fare, Youth Fare, etc. These fares may act as dilutionary in a capacity constrained situation, but may continue in the larger interest of promotion of foreign tourist traffic to India. The revenue loss to Indian Airlines would be very small compared to the benefit accruing to the national exchequer in foreign currency through the multiplier effect of tourism.

- 6.17 The Committee also recommends that Indian Airlines may be given complete autonomy in introducing special fares for commercial/marketing purposes. Special fares on non-commercial considerations should be introduced only when so directed by the Government and Indian Airlines should be subsidised by the Government to the extent of its revenue loss.

Cargo Rates

- 6.18 Since the non-passenger revenue has been treated as a by-product realisation, the Committee recommends that Indian Airlines may determine the freight rates for cargo and other dead loads taking into account marketing considerations.

Flexibility

- 6.19 The LRMC based fares would provide the basic structure for domestic air tariff. However, the Indian Airlines should be allowed flexibility to vary the LRMC based fares within a given range i.e. -25 per cent to + 10 per cent of the fare in view of exceptional operational reasons (like difficult flying conditions, incidence of abortive flying, etc.), technical reasons (like loss of payload) or commercial reasons (like yield optimisation, market development or route profitability) which may arise from time to time, provided the increase in fare is got ratified by the Government.

Revision of Fares

- 6.20 The Committee recommends that every five years a fresh exercise be undertaken for computation of long run marginal costs for the best practice aircrafts available at that time and for revising and updating the norms for the existing aircraft. An appropriate time for such an exercise would be the last year of every Five Year Plan, when information about demand forecasts, fleet acquisition patterns, etc. are available.

Escalation on Fares

- 6.22 The proposed fares are based on 1989-90 prices. Increases in input costs for (a) fuel; (b) landing and navigational charges; (c) wage revisions; (d) stores and spares; and (e) foreign exchange fluctuations affecting repayment obligations may be reviewed once a year. Indian Airlines must develop a system for productivity measurement and monitoring and distributing productivity gains to users and employees. Since landing and navigational charges, foreign exchange fluctuations and increase in statutory levies and fuel costs (as fuel saving with the ageing of aircraft is not possible) are beyond the control of Indian Airlines, 100 per cent increase in these costs should be allowed for escalation purpose. For all other inputs, only 90 per cent of the increase in input costs should be reckoned; the balance to be absorbed by Indian Airlines by way of increased productivity. The weights for the different items in the escalation formula should be based on the shares of different inputs in total costs in the base year.

Effect of Foreign Exchange Premium

- 6.22 It was noted in chapter 3 and 4 that cost of fuel and capital are the major determinants of costs/ASKm. Under the existing tariff cum administered price

regime the costs of imported capital equipment to Indian Airlines are below the social cost of capital, but the cost of ATF is above the social cost of ATF. These distortions, in the factor prices and the provision for recovery of depreciation, interest and assessed return on equity would encourage Indian Airlines to buy costly capital intensive aircrafts and equipment. The sensitivity analysis of chapter 4 section 3 reveals that, if a foreign exchange premium is also added to the import costs, LRMC will increase by about 6 per cent. As the incidence of this cost has not been recognized in the proposed tariff, it remains under priced to this extent. The Committee recommends that the existing distortion in these factor prices be corrected during the Eighth Plan to enable Indian Airlines to make socially efficient decisions in the acquisition of new aircrafts.

Quality of Service*

6.23 Quality of airline services can be measured in terms of on-time performance, safety, frequency of service, time of departure, cleanliness of aircraft, etc. In a monopoly environment, it is necessary to develop and implement schemes for improving the quality of service in order to mirror the market forces so that the performance and rewards can be made transparent.

6.24 The value of air passenger service depends mainly on the saving in time to the traveller. Long delays and last minute cancellations create hardships to air travellers. In order to increase the probability of on-time performance by the airlines and compensate the consumer for delayed arrival of the flights, the Committee recommends a system of penalties as outlined below:

If a flight reaches its destination late by

- (a) less than one hour : no penalty
- (b) above one hour and below three hours : 20 per cent of the fare as penalty
- (c) above 3 hours : 30 per cent of the fare as penalty.

6.25 For ease in implementation, the figures may be rounded off to the nearest fifty rupees and Indian Airlines may pay the amounts in the form of coupons in Rs. 50 denomination, cashable in a nationalised bank. The minimum amount payable should be Rs. 50. Indian Airlines could then discontinue the present practice of providing refreshments/meals, etc. to the stranded passengers.

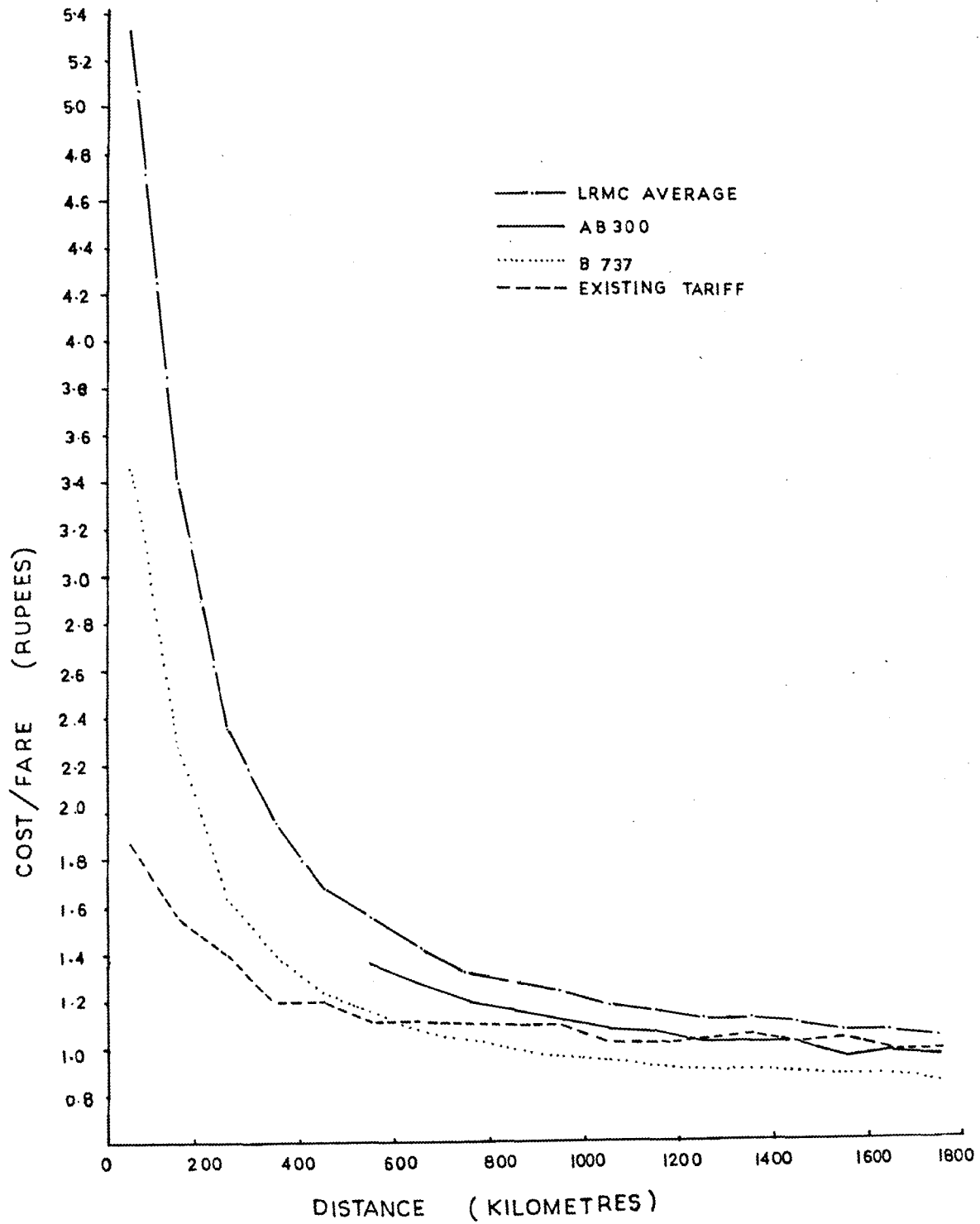
* Mr. R. Prasad does not agree with the recommendation A dissenting note is given in appendix.

6.26 The Committee recommends an incentive scheme and a penalty scheme for improving the quality of domestic airline services. An independent agency may be asked to make periodical appraisal of consumer satisfaction of domestic airline services, as it is being done in a few developed countries. Bonuses above the statutory limits for all the employees should be linked to the consumer satisfaction rating as assessed by this independent agency. Performance indices and the sharing of incentives will of course need to be worked out in consultation with the employees' organisations and management.

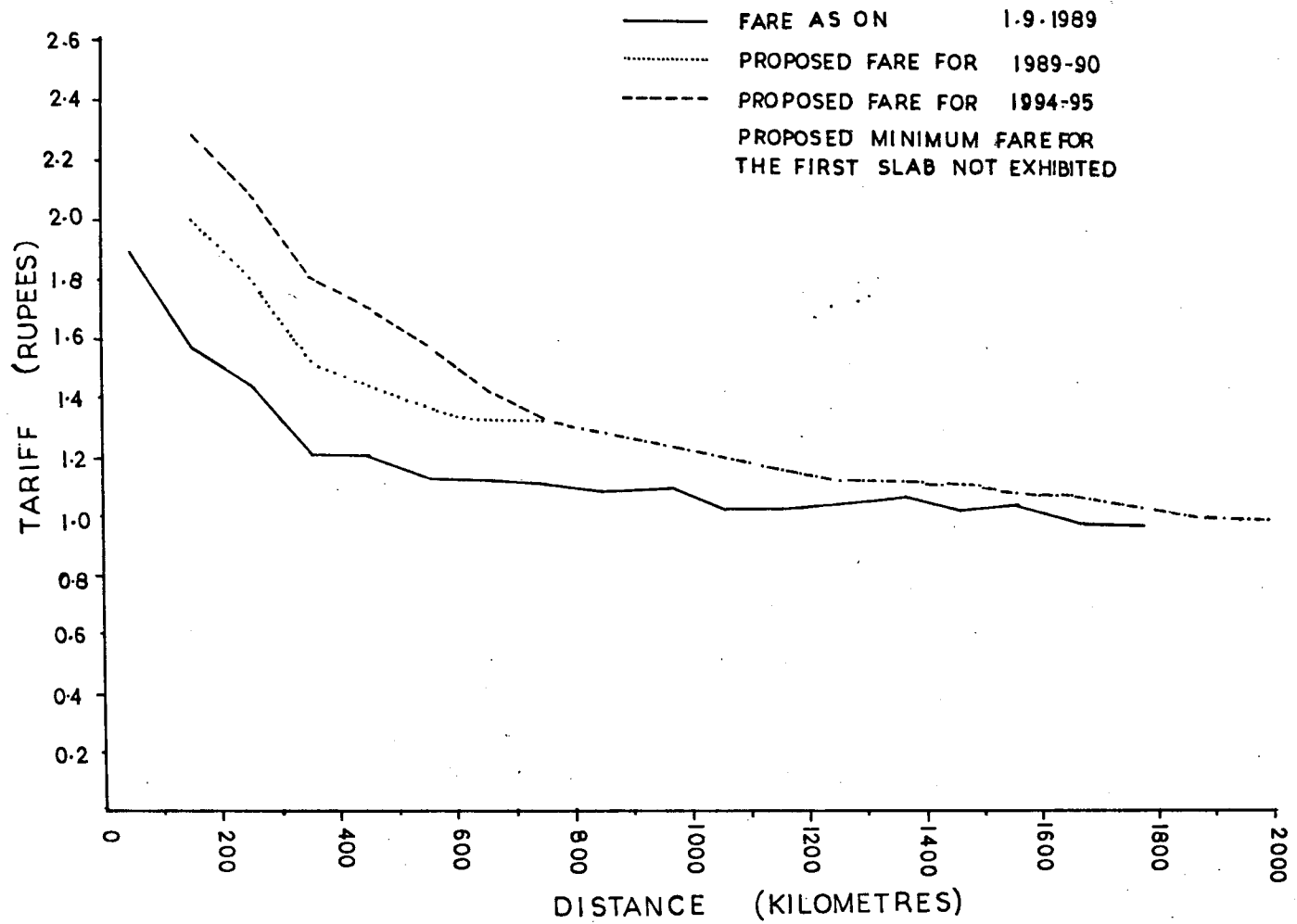
Annexure - I

	Cost			
	US\$ (in million)	Rs. in Crores	Custom Duty (Rs. in Crores)	Total (Rs. in Crores)
19 Nos. A-320 - 1989/90				
a) Aircraft	773.589	1199.06	37.17	1236.23
b) Engines etc.	50.609	78.44	11.77	90.21
	<u>824.198</u>	<u>1277.50</u>	<u>48.94</u>	<u>1326.44</u>
Less cash discount	60.800	94.24	-	94.24
Net	<u>763.398</u>	<u>1183.26</u>	<u>48.94</u>	<u>1232.20</u>
c) Spares & Stores	84.027	130.24	32.56	162.80
Total	<u>847.425</u>	<u>1313.50</u>	<u>81.50</u>	<u>1395.00</u>
6 Nos. A-320 - 1990/91				
a) Aircraft	263.138	407.86	12.64	420.50
b) Engines etc.	16.733	25.94	3.89	29.83
	<u>279.871</u>	<u>433.80</u>	<u>16.53</u>	<u>450.33</u>
Less cash discount	19.200	29.76	-	29.76
Net	<u>260.671</u>	<u>404.04</u>	<u>16.53</u>	<u>420.57</u>
c) Spares	21.146	32.78	8.20	40.98
Total	<u>281.817</u>	<u>436.82</u>	<u>24.73</u>	<u>461.55</u>
6 Nos. A-320 - 1991/92				
a) Aircraft	277.206	429.67	13.32	442.99
b) Engines etc.	22.687	35.16	5.27	40.43
	<u>299.893</u>	<u>464.83</u>	<u>18.59</u>	<u>483.42</u>
Less cash discount	19.200	29.76	-	29.76
Net	<u>280.693</u>	<u>435.07</u>	<u>18.59</u>	<u>453.66</u>
c) Spares	22.211	34.43	8.61	43.04
Total	<u>302.904</u>	<u>469.50</u>	<u>27.20</u>	<u>496.70</u>

EXISTING TARIFF AND AIRCRAFT TYPEWISE COST



EXISTING AND PROPOSED FARE



7 *Uneconomic Services and Criteria for Subsidy*

Introduction

- 7.1 The Steering Committee for Transport Planning (SCTP) and the Committee on Public Undertakings (COPU) (in its Report dated April 28, 1988) remarked that nearly two-third of the services operated by Indian Airlines are uneconomical. The COPU attributed the losses on short haul routes to high cost of operations and dismally low level of fares. The Committee concluded that it led to "an inescapable conclusion that fares on the long distance operations have been jacked upto such an extent as to cover not only the losses incurred on the short haul operations on account of low fares but also to provide a margin over the total cost of operations." The Planning Commission's Report entitled "A Study on the Economics and Role of Short Haul Air Service" made a detailed study of the relationship between length of haul and different cost components. The Report found evidence for heavy cross subsidisation from "long hauls to short ones in the operation of Indian Airlines." It expressed the view that "internal cross subsidisation of this kind is not desirable both on ground of equity and economic efficiency."
- 7.2 In the light of these observations, it is necessary to develop a criteria for determining whether a particular service is economic or uneconomic. It is also necessary to develop a basis for determining whether a price is subsidy free or not. Another task of this Committee is to recommend eligibility criteria for

grant of any direct subsidy for loss making services otherwise considered essential to operate. Section 2 considers the relationship between length of haul and different components of cost. Section 3 is devoted to the determination of whether a route is economic or uneconomic. It also deals with the definition and determination of subsidy free prices. Section 4 recommends eligibility criteria for grant of direct subsidy to domestic airlines.

Relationship Between Haul and Cost Components

- 7.3 It was observed in chapter 4 that for a particular aircraft, while the ASKms vary proportionately with the length of haul, some components of cost are independent of the length of haul and a few other components increase less than proportionately with the length of haul. The exact nature of the relationship between each of the major components of cost and length of haul/distance has been explained in chapter 4.
- 7.4 It is obvious that landing and handling costs, which are independent of the length of haul/distance flown, must decline when these costs are computed per ASKm. In case of fuel and oil and direct aircraft maintenance, marginal costs per distance or time are constant but the average costs continually decline with distance or time and, therefore, also with ASKm. It may be seen from Figure 7.1 that the other components of the total unit cost for A-320 also vary inversely with ASKm even though the rates of fall in these curves are smaller.
- 7.5 The inverse relationship between cost/ASKm and distance holds for any aircraft, because of the two fixed components and positive constants in the equations for fuel and oil and direct aircraft maintenance. However, the relative importance of the cost components vary depending on the type of aircraft.
- 7.6 It was shown that cost/ASKm was the highest for A-320 and lowest for B-737. In the case of fuel and oil consumption (in kilograms), the relationship is reversed as it may be seen from Figure 7.2. The reason is that the new aircraft A-320 is capital using and fuel saving while the existing aircraft Boeing 737 is capital saving and fuel using.
- 7.7 Both A-320 and B-737 can be utilised for short haul operations. For five short haul sectors the LRMC cost breakdowns are given in Table 7.1 alongwith the actual cost breakdown for B-737. It is interesting to note that for the shortest haul the existing fare covers just the fuel cost for B-737.

Table 7.1

Costs for A-320 and B-737 Componentwise for Selected Short Haul Sectors (Rs./Passenger Km.)			
Sector	Distance Kilometre	LRMC A-320	Actual Cost B-737
Lucknow-Kanpur	61		
Fuel Cost		0.882	1.782
Direct Aircraft Maintenance		1.138	0.645
Crew and cost related to ASK/RPM		0.338	0.324
Landing and Handling		0.897	0.798
Total including other costs		7.041	4.377
Bombay-Pune	122		
Fuel Cost		0.570	1.137
Direct Aircraft maintenance		0.605	0.368
Crew and Cost related to ASK/RPM		0.278	0.270
Landing and Handling		0.653	0.573
Total		4.180	2.852
Delhi-Jaipur	246		
Fuel Cost		0.349	0.501
Direct Aircraft Maintenance		0.337	0.212
Crew and cost related to ASK/RPM		0.243	0.244
Landing and Handling		0.258	0.284
Total		2.440	1.703
Bhopal-Nagpur	302		
Fuel Cost		0.348	0.570
Direct Aircraft Maintenance		0.288	0.183
Crew and Cost related to ASK/RPM		0.237	0.239
Landing and Handling		0.181	0.161
Total		2.093	1.503
Delhi-Udaipur	504		
Fuel Cost		0.339	0.460
Direct Aircraft Maintenance		0.202	0.133
Crew and Cost related ASK/RPM		0.227	0.230
Landing and Handling		0.208	0.139
Total		1.608	1.185

Uneconomic Routes

- 7.8 Since long run marginal cost is the least cost method of providing a service, given the best technology and norms for input utilisation, it is often inferred that a service is uneconomic if it does not cover its long run marginal cost. In the case of public utilities, the incremental cost principle has been applied to decide whether a service should be continued or not. The incremental cost principle can also be applied in the presence of economies of scale, joint costs and economies of scope. Empirical studies on airline cost functions show that economies of scale are not significant. However, in view of the indivisibility, in particular with respect to aircraft capacity and some joint and common costs it is useful to consider incremental cost also.
- 7.9 The incremental cost of operating a flight includes (a) landing cost; (b) fuel and oil cost; (c) direct aircraft maintenance cost; and (d) cost related to RPKms. The sum of these four costs is denoted as variable cost (VC). Figure 7.3 gives VC/ASKm as a function of the length of haul. This cost, after adjustment for dead load factor, booking agency commission and 70 per cent seat factor is referred to as variable cost component of LRMC to IA in Figure 7.3. Since these costs are avoidable to Indian Airlines with reference to a flight cost, one can prescribe this as lower bounds for the concessions.

The table below indicates the lower bounds for the sectors given in Table 7.1.

Sectors	Distance	Amount (Rs./ Passenger Km.)
1. Lucknow-Kanpur	61	2.95
2. Bombay-Pune	122	1.77
3. Delhi-Jaipur	246	1.00
4. Bhopal-Nagpur	302	0.87
5. Delhi-Udaipur	502	0.55

- 7.10 Faulhaber defines a subsidy free price as follows:
"If the provision of any commodity (or group of commodities) by a multi-commodity enterprise subject to a profit constraint leads to prices for the other commodities no higher than they would for themselves, then the price structure is subsidy free" (American Economic Review, Vol. 65, December, 1975). As the Committee has recommended immediate switchover to LRMC based tariff from the existing tariff for distances above 700 kms. there will be no subsidy

element for the long haul sector. For distances below 700 km. the proposed fares are below the LRMC's during the transition period. Even though the ultimate objective is to match the tariff with LRMC for all sectors, this would involve a steep hike in prices for the short haul sectors. In many countries the short haul fares are very high compared to long haul fares.

7.11 Table 7.2 provides the comparative rates for passenger services for distances 1-200 to 601-800 kms. in a few selected countries. While the fare in the 1-200 kms. slab is 2.16 to 3.68 times of the fare in 601-800 kms. slab in other countries, in India the fare for 1-200 kms. slab is only 1.54 times of the fare in 600-800 kms. slab. The proposed tariff will raise the ratios in 1989-90 to .210, and in 1994-95 to 2.75. The share of the short haul sectors in total RPKm is only 12.94 per cent.

Distance Slab (kms.)	% of RPKms
1-300	3.16
301-500	9.78
501-800	18.66
801 and above	68.40
Total	100.00

7.12 Even though the proposed tariff for 1989-90 for distances less than 700 kms. does not recover LRMC, it does not follow that Indian Airlines is losing in these sectors because the weighted average cost of the existing fleet mix is lower than the average proposed fare and this provides some cushion for Indian Airlines till the existing aircraft is phased out. Earlier committees came to the conclusion that there was considerable internal cross subsidisation from long haul services to short haul services. The conclusion was reached on the basis of the comparison of the cost of operation of the existing aircraft and fare structure. The appropriate basis for assessment of the extent of cross subsidisation is the difference between LRMCs and the tariff. The deviations between the LRMCs and the existing tariff for distances above 700 kms. are relatively small, and therefore, it cannot be considered that the long haul fares have been loaded to subsidise the short hauls. The under recovery in short haul has been made up partly by the higher seat factor in the long haul, and lower weighted average cost per km. of the existing fleet. Hence, Indian Airlines is bearing the bulk of the subsidy.

Table 7.2

Comparative Rates (in Rs./Passenger Km.) Based on Sample Sectors in Selected Countries - July 1989										
Sector (kms.)	India		France		Italy		U.K.		Japan	
	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%
1-200	1.70	154	10.54	368	7.42	248	10.64	295	7.87	216
201-400	1.31	119	7.72	269	3.63	122	-	-	-	-
401-600	1.16	105	2.98	104	3.37	113	3.76	104	4.58	125
601-800	1.10	100	2.86	100	2.98	100	3.60	100	3.65	100

Source: Indian Airlines

Note : Figures under % column give the slab rates as % of rate in first slab.

7.13 Our LRMC exercise is based on sectoral costs. In the case of non-stop flight a decision on economics of the route may be based on comparison of LRMC/ proposed tariff with related revenue per passenger km. However, in the case of a hopping flight, a decision has to be made by comparing total route revenue with total route costs, ignoring individual sectoral costs and revenues. Even if a route is uneconomic, judged on the basis of the above criteria, its continuance may be necessary if it is a feeder route and has a high seat factor.

Criteria for Subsidy

7.14 Since the Air Corporation Act 1953, provides clearly that subsidy will be admissible to the Indian Airlines only if a service is operated at the direction of the Central Government and only if the Corporation suffers an overall loss in respect of the operation of all its services, it does not appear worthwhile to lay down detailed criteria for evaluating the profitability of each service for the purpose of subsidy. However, the Committee does recognise the fact that certain routes may warrant special consideration due to characteristics peculiar to such routes, like the routes in the north-eastern region where surface transport is extremely difficult and time consuming and air travel is the only means of communication in the difficult terrain. Therefore, the Committee recommends that the fare levels in such cases may be kept 25 per cent below the LRMC based fares. The loss in revenue due to such lower fares, however, should not be suffered by Indian Airlines. The Government may consider ways and means

to compensate Indian Airlines to the extent of such loss of revenue by suitably amending the Air Corporation Act 1953, which has also been recommended strongly by the Committee on Public Undertakings in its 47th Report.

FIGURE 7.1

A-320 COMPONENTS OF COST

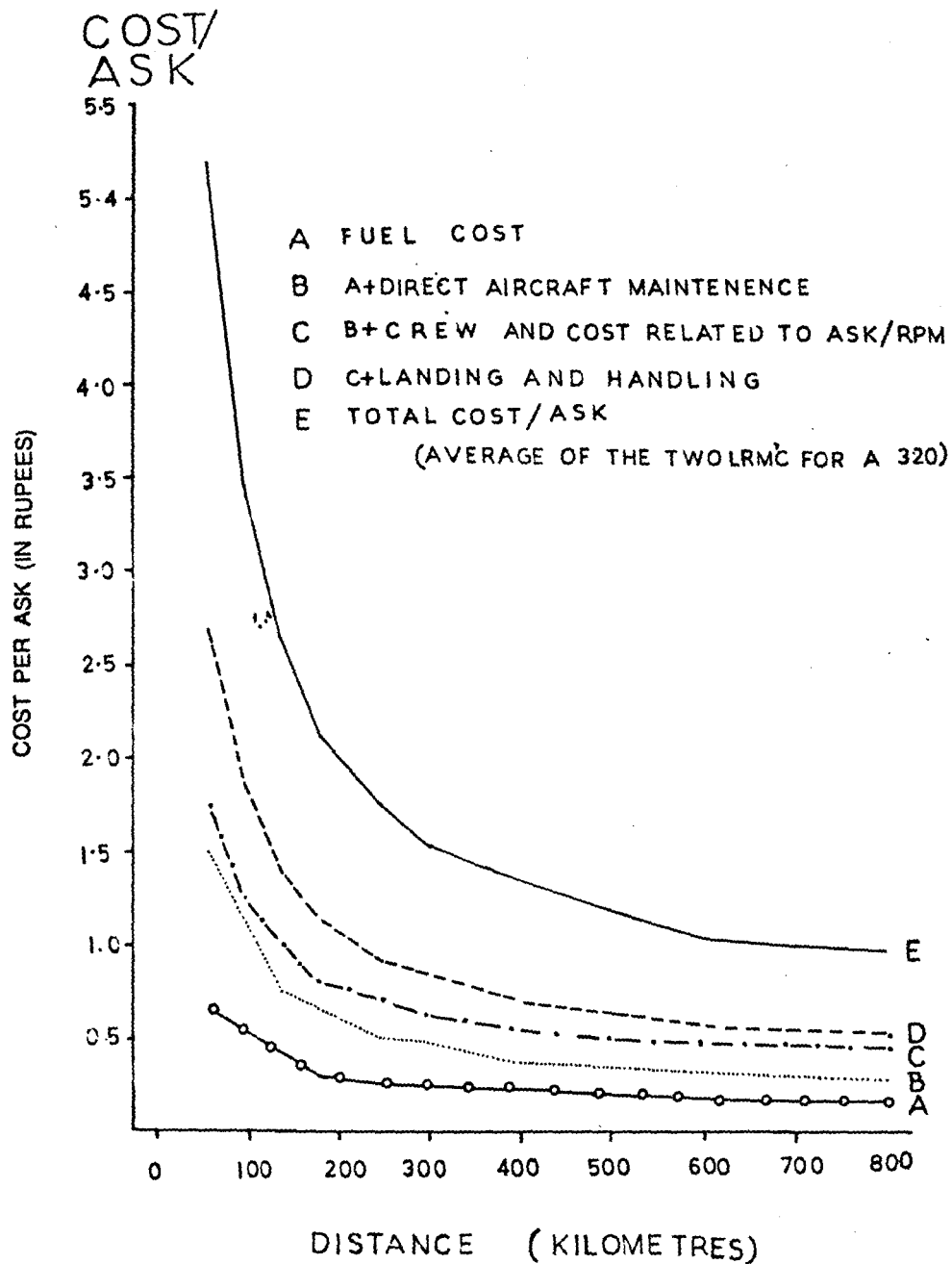


FIGURE 7.2

FUEL CONSUMPTION/ASKM

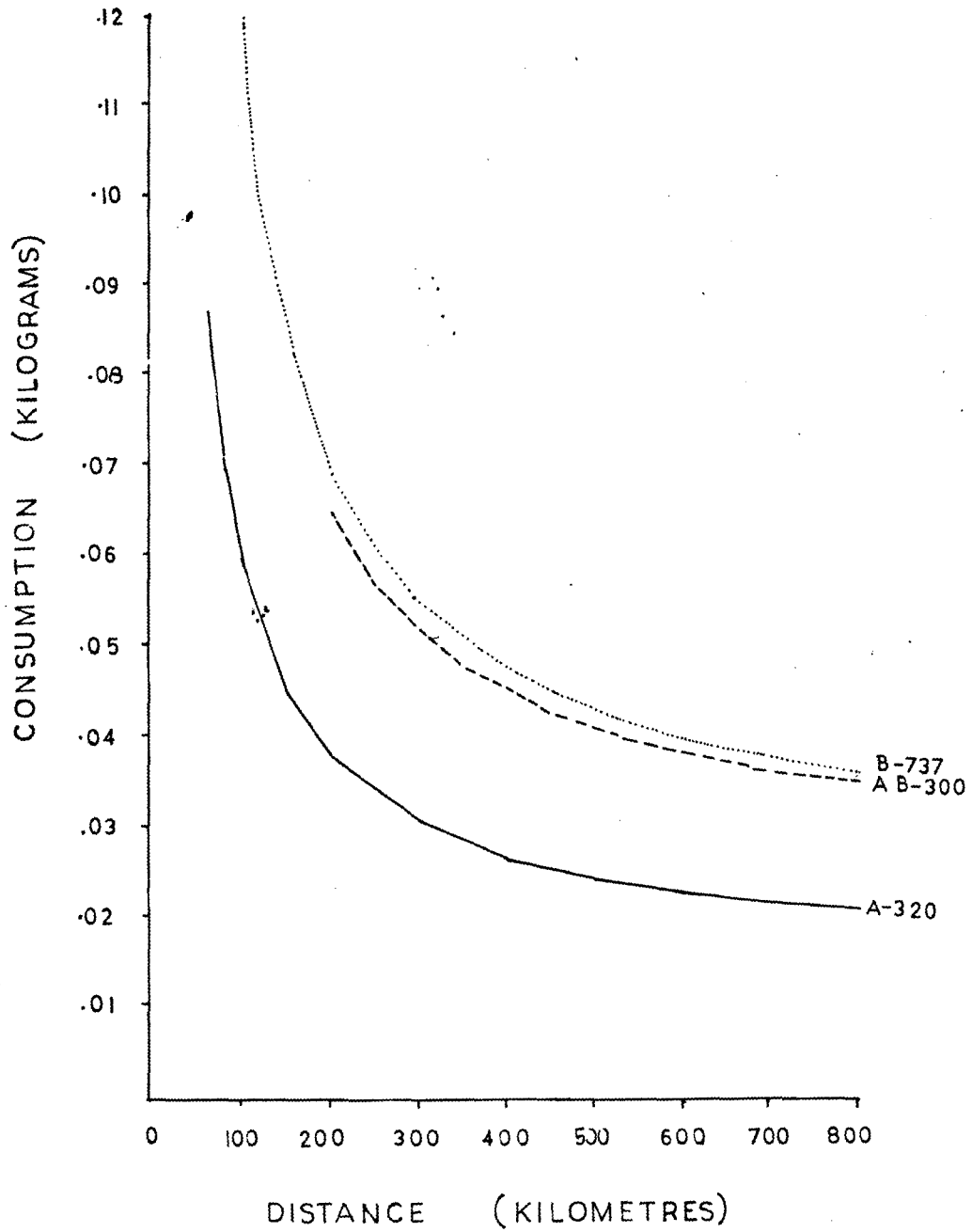
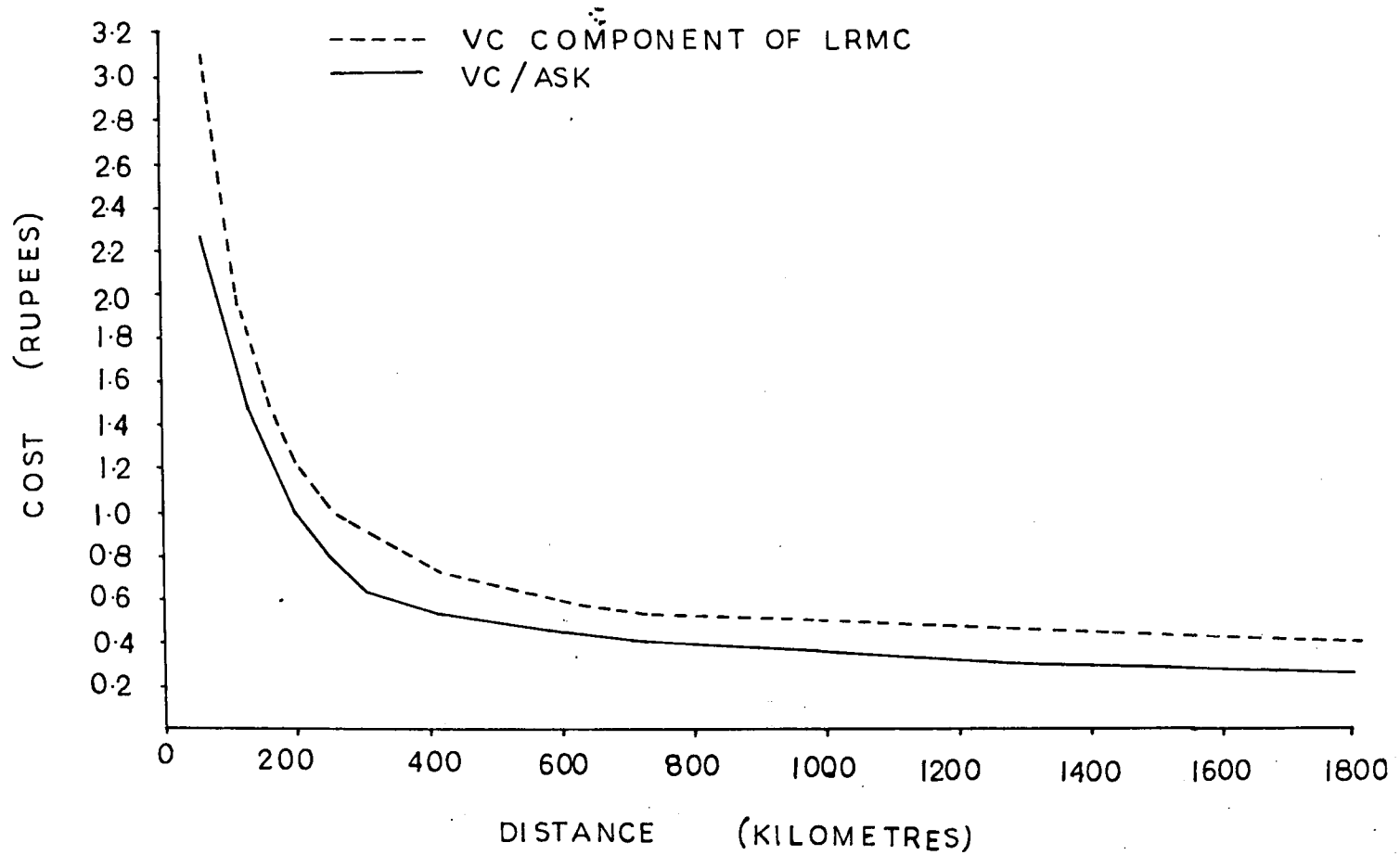


FIGURE 7.3

VARIABLE COST PER ASKM



8 *International Experience on Deregulation — Lessons for India*

Introduction

- 8.1 Until recently airline industry was considered a natural monopoly public ownership or regulation of private air carriers was considered necessary in the public interest. Reasons advanced for public ownership of regulations were:
- (a) Economies of scale
 - (b) Infant industry
 - (c) Need for developing an integrated national network
 - (d) Fulfilling regional goals so that the service can be made available to small cities or areas inaccessible by surface transport
 - (e) Airline safety
 - (f) Import control of aircraft and fuel to meet balance of payment problems
 - (g) Encouraging tourism
 - (h) Acquisition of new technology
 - (i) National defence needs
 - (j) National pride
- 8.2 USA preferred private ownership with federal regulation by Civil Aeronautic Board for regulation of entry, route pattern and fares. Countries such as U.K., Canada, Australia, Japan, New Zealand, Chile and many European countries

preferred total or partial public ownership of air carriers. In some countries like Canada, Australia and Mexico there were more than one public carriers operating in the same market, but the fares and conditions of service were regulated by Government. In some European countries, the Government had partial ownership of their respective flag carriers (Air France, Lufthansa, Sabina, Swissair). In a few cases a company was owned by more than one Government (Air Afrique owned by Governments of 11 nations and SAS owned by companies in Denmark, Norway and Sweden with 50 per cent public participation and 50 per cent private participation).

- 8.3 Fifty years of experience in public ownership and Government regulation of entry, fares and freights and capacity as well as recent development in economic theory and applied research cast doubts on the validity of some of the arguments advanced for regulation/public ownership. Advocates of deregulation contend that the efficiency cost of airline regulation is very high because of excessive scheduling by competing airlines in trunk routes, inefficient route network, lack of variety in prices, quality packages, inefficient capital-labour-fuel-mix, excessive use of capital and lack of innovation. Empirical studies of airlines cost show that beyond a threshold level of 5 to 10 aircrafts unit costs (per available seat mile) do not seem to decline with increasing fleet size.
- 8.4 A recent study¹ has stressed two dimensions of an airline size (a) the size of each carrier's service network; and (b) the magnitude of passenger and freight transportation services provided. They find constant returns to scale (10 per cent increase in output and number of points served with 10 per cent increase in all inputs used, with average stage length, average load factor and input prices held constant). However, they find substantial economies of density (10 per cent increase in output requiring less than 10 per cent increase in all inputs with points served, average stage length, average load factor and input price held constant) for all carriers of all sizes.
- 8.5 Other researchers² have argued that under certain conditions even natural monopolies could be expected to reach efficient equilibria without regulation. Their conditions for contestability are:
- (a) equal access to economies of scale
 - (b) equal access to technology
 - (c) no sunk cost
 - (d) price sustainability

They believe that aircrafts are mobile and airlines use publicly provided airports, airways and communication facilities rather than constructing their own. There are little sunken costs because of options for leasing aircraft, contracting for maintenance and ground service and even contracting reservation service. It is argued that non-participants can be such perfect potential entrants that they can offer a supply response without a monopoly fixing price above the competitive price.

- 8.6. Regulatory agencies face many problems in regulating entry and determining administered prices under fast changing market conditions. Issues relating to determination of fair rate of return on capital, valuation of capital, adjustments for input price changes, regulatory lag, etc. raise question about the feasibility and efficiency of social intervention. Public discontent with public ownership and regulations as well as the recent shift in ideology in favour of market determined prices are some of the other factors responsible for the global shift towards deregulation.
- 8.7 In USA, the Airline Deregulation Act of 1978, resulted in the complete deregulation of the US airlines industry. The US policy also influenced the policies of many countries including Canada, Australia, Japan and a number of European countries. There have been many studies assessing the costs and benefits of deregulation in U.S.A. There are a few quantitative evidence for countries such as Canada, Australia, many European countries and Mexico. In the following paragraphs we review the experiences of various countries on deregulation and we draw some lessons for India.

Deregulation Experience

U.S.A.

- 8.8 Before 1978, in order to enter a market, the carriers had to demonstrate that the entry was required for public convenience and necessity. From 1982, entry has been granted to all carriers if they are fit, willing and able. From January 1983, all regulations on fares were eliminated. Even before 1978, more than one carrier operated in most routes. Even the flight frequency was not explicitly regulated. In many routes there were intensive non-price competition through service frequency as well as in-flight amenities. The promises of deregulation were:
- (a) free route entry and exit would foster more efficient equipment utilisation;

- (b) more rational route structuring and providing subsidy targeting for essential service;
- (c) pricing competition would produce lower fares, greater choice of products and airlines would eliminate costly service competition;
- (d) reduced Government involvement and increased efficiency would improve financial viability;
- (e) anti-trust laws would be a safeguard against industry concentration and predatory behaviour.

8.9 S.Morrison and C. Winston⁴ estimated that travellers gained US \$ 6 billion (in 1977 dollars) annually through lower fares and better services and that the airlines improved their own earnings by 2.5 billion dollars annually. A.E. Khan,⁵ the architect of deregulation in U.S., reports that between 1976 and 1986 the average yield per mile dropped by 28.5 per cent in real terms, average employment in the industry increased by 39 per cent and revenue passenger emplanement by 87 per cent. The smallest towns – the so called non-hubs have experienced no change in their average weekly departures between 1978 and 1987.

8.10 A.E. Khan notes that travellers have a wide variety of choices and about 90 per cent of passengers travelled on discount tickets at an average discount of 62 per cent from posted coach fare. However, the benefits were unevenly distributed; the yields were markedly higher on more thinly travelled routes and higher for the minority of travellers who had to pay the full fares.

8.11 One unanticipated surprise is the emergence of hub-and-spoke system of operation. By routing all flights through a hub, airlines found that they could offer services to most cities while operating their planes at closer to full capacities. It provides superior quality of on line service compared with interline service, full utilisation of larger planes and the possibility of offering a wide range of destinations from all originating points. Another big surprise was the development of the computer reservation system. American Airlines Sabre Computer Reservations System (CRS) accounts for 27 per cent of the terminals used by travel agents in U.S.A. CRS provides information on how much travellers are willing to pay and where they want to go. Armed with this information a big airline could use its CRS to develop their clientele and also to price seats as they may otherwise would have gone empty at less than the cheapest rates its competitors may offer.

- 8.12 Another development is the strategic response of the big airlines in offering frequent flyer programmes (FFP). A FFP is a purchase incentive plan which rewards the travellers with a free trip based on the distance travelled and certain other conditions for rebate purchase of the service by a particular air carrier. In 1985, 10 million individuals were members of the FFP. The FFP favours large carriers with large network. The FFP programme creates principal-agent problem. "The joy of it is for most frequent flyer is that he is getting freebie for something which as the business traveller, their fares paid for by somebody else in the first place." The value of unnecessary travel accumulated by FFP is estimated to be \$ 9.5 billion. The CRS and FFP tend to increase the industry concentration.
- 8.13 Prof. Levine points out that the following evidences raise doubt about the perfect contestability hypothesis-hub domination, FFP, CRS, complex fare structures, new entrant mortality, congestion in major airports. He argues that the industry has been profoundly attracted by the costs of developing communication about routes schedules, seat availability service features and price to consumers and economies of scope. Cost involved in monitoring the behaviour of parties to transactions and economies of scale in information act as barriers to entry. However, he concludes that airline deregulation has undoubtedly proved beneficial and ought not to be undone. In the article cited earlier, 'Economist', says that the Americans enjoy the world's cheapest and most flexible travel. The big airlines have had to cut their bureaucracies and debt, deal with chronic labour problems and how to price their products in a free market. Khan in his AER paper concludes that "the last 10 years have fully vindicated our expectations that deregulation would bring lower fares, a fare on an average in closer conformity with the structure of cost, an increased range of price-quality options and greater improvement in efficiency."

Canada

- 8.14 In Canada, there were two major publicly owned airlines — Air Canada and Canadian Pacific Airlines, the former accounting for 52 per cent of the total industry revenue and the latter about one-third of the revenue in 1977. There were also regional carriers. The South Canadian Airlines' market was deregulated as of January 1988. The motivation for moving to market was to allow Canada to reap the positive benefits of competition including lower fares and broader offering of prices, service quality, improvements in production efficiency in greater innovation. Gillen, Oum and Tretheway find that during 1964 to 1981 Crown ownership of Air Canada resulted in a reduction in

production efficiency on the average of about 23 per cent of the carriers' cost.

- 8.15 The Government plans to privatise Air Canada with an initial sale of 45 per cent of the equity and eventually complete sale. Entry in the Canadian market may not be easy because of the advantage enjoyed by the two dominant public carriers.

Australia

- 8.16 Australia has two public carriers - Ansett and Australian. The industry was subject to regulations of entry, capacity regulations in each route, administered prices and import regulations of aircraft. The Australian Minister for Transport and Communications announced on 7th October, 1989 gradual withdrawal from economic regulation based on the May review. The review drew attention to significant public discontent with the Government policy. After adjusting for difference in cost environment, nature of service provided, route network, and quality of services provided, it was estimated that the Australian trunk airlines was 7 per cent to 10 per cent more costly than the U.S. airlines undertaking comparable operations. The statement indicates that by October 1990, control over import of aircraft, determination of passenger capacities, constraint on entry in domestic trunk routes and regulations of fares will be abolished. However, inter-state aircraft will be subject to surveillance by the Price Surveillance Authority.

Mexico

- 8.17 Until recently Mexico had two state owned carriers - Aero Mexico and Mexicana De Aviation. Their performances were very poor. In response to a strike of Aero Mexico ground workers in 1988 spring, Government declared the airline bankrupt and sold it to a group of prominent businessmen. Since then it shed some unprofitable routes, making the carrier more efficient while giving a pannel of regional airlines particularly to take over those flights. Mexico also allows U.S. carriers to operate in Mexico. Aero Mexico's Vice-President states that the Airlines are show case for many of the things the new Government is trying to accomplish. Wall Street Journal highlights the improvements in the performance of Aero Mexico services since October, 1988. The Government also plans to try to sell its 58 per cent interest in Mexicana, the country's largest carrier.

Experience of Other Countries

8.18 British Airways was fully privatised in 1987 and Japan privatised 34.5 per cent of Japan Airlines during 1987. Most European Governments are having partial public ownership. The process of deregulation is to begin by 1992. New Zealand has deregulated its airline industry, but is maintaining Government ownership of Air New Zealand. Chile has deregulated while retaining crown ownership of its major carrier.

Relevance to India

8.19 There are some methodological problems in evaluation of welfare effects of deregulation. Since the two alternative regimes never existed simultaneously at the national level in U.S.A., Morrison and Winston posed the following question: What would have been the estimate of deregulated welfare for travellers and carriers in 1977 compared with actual 1977 regulated welfare for them? Also, the full effects of deregulation are realised after many years as the deregulated units have to adjust their capital structure, routes pattern and strategies in response to free market signals. Inter-country comparisons of performance also create difficulties because of differences in public-private ownership patterns, market size, fleet-mix and type of regulatory regime.

8.20 The U.S. experience is not directly relevant to India. Even before deregulation, there was interline competition in many routes. The airlines were privately owned and regulation covered only three areas – entry, pricing and safety. The experiences of Australia, Canada, Mexico and European countries are, however, of some interest to India. In these countries, the dominant carriers were publicly-owned and there were tight regulations on entry, fares, capacities and import of aircrafts.

8.21 In India, Indian Airlines is 100 per cent owned by the Government of India and enjoys virtual monopoly in the domestic operations (except in some short haul sectors). Government approval is necessary on many important matters including acquisition/leasing of aircraft and other equipments, pattern of financing, fixation of fares and freights, adding or dropping of routes, etc. The various distortions noted in chapter 2 are the outcome of public monopoly and regulatory practices.

8.22 It is recommended that the process of deregulation must be attempted in a phased manner. The foreign exchange constraint is likely to be binding for

another decade and, therefore, Government control over imports of aircrafts and financing of aircraft cannot be dispensed with. Any attempt of deregulation or liberalisation of the domestic aviation industry, particularly another entry in this sector in India must ensure that there is no excess demand on scarce resources. There is a case, no doubt, for private entry but only if the new entrant can finance the inputs without Government support/guarantee.

8.23 Even our proposed normative pricing proposals may not ensure that Indian Airlines will actually lower its costs. In order to achieve this, it requires credible market threat leading to possible loss of revenue or market share. This can be achieved by changing the present pure monopoly power of the Indian Airlines. As market size expands, it is possible to have more than one full fledged airline in the domestic market. The Government has already imposed some sort of competition by permitting the air taxi scheme. However, it is not clear whether it is the best among the various alternatives to liberalise the domestic airline market.

8.24* The Committee feels that when the balance of payment situation improves, appropriate steps can be initiated to introduce a new domestic airline in the market. One of the models for such liberalisation is that of Australia, where controlled competition seems to have yielded positive results.

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* See Annexure

**Note of Dissent by Mr. R. Prasad in Respect of Certain
Recommendations of the Committee**

Para No. 6.25

The recommendation that there should be penalty on Indian Airlines for a certain percentage of fare in case of delay to a flight, is not acceptable to me in view of the fact that most delays take place due to reasons beyond the control of Indian Airlines viz., bad weather, technical snags, closure/restriction of airfields, bird hits, etc. Penalising Indian Airlines financially will, therefore, be unfair. Such a practice is not prevalent in the aviation industry.

From the passenger service aspect too, the financial penalty will provide little satisfaction, as in case of delay/disruption, a passenger requires certain comforts viz., refreshments/meals, transportation back to city, sometimes hotel accommodation, etc. Indian Airlines voluntarily provides such passenger comforts at the time of disruption.

From the practical point of view also, it will be extremely difficult for this recommendation to be implemented, as cash refunds will not be possible in respect of tickets issued against credit facilities, credit cards or by travel agents as well as other airlines' tickets, due to accounting complications. Also rounding off the amount of penalty to the nearest Rs. 50 will grossly distort the percentage of penalty from sector to sector. There will also be controversies about the interpretation of the extent of delay, as there is a variable time lag between the time of touch down, parking of aircraft, opening of the door, disembarkation of the passengers and indeed the time of baggage delivery. It will also be difficult to include this cost in the fare as it would vary from time to time.

In view of the above mentioned reasons, I record my dissent in respect of this recommendation.

Para No. 6.28

This recommendation about an independent body assessing the level of customer service and the proposal to introduce an incentive bonus to the employees based on the "consumer satisfaction rating" is not acceptable to me as this recommendation is impracticable. Firstly, there cannot be a truly independent body for assessing customer satisfaction, as any such body will be biased either against Indian Airlines or in favour of Indian Airlines

depending upon the people in this body, their past experiences and their motivations. Secondly, obtaining reliable and valid feed-back from a dependable sample size of airlines' customers would be impossible in view of the large and constantly growing volume of traffic as well as the highly subjective nature of the recommended scheme. Also, even if such a recommendation could be implemented, it will result into industrial relations problems in view of its controversial nature.

I, therefore, record my dissent in respect of this recommendation.

Para No. 8.24

This recommendation favouring incorporation of another domestic airline in India is not acceptable to me as such a measure will result in avoidable additional investment, sub-optimum utilisation of scarce national resources and foreign exchange, wasteful competition and wastage of considerable synergy of Indian Airlines. I feel that our developing economy with severe resources constraints, cannot afford the luxury of a second domestic airline at the present stage of development.

I, therefore, record my dissent in respect of this recommendation of the Committee.

No. T&C/4(3)/88
Government of India
PLANNING COMMISSION
(Transport Division)

Yojana Bhavan, Sansad Marg,
New Delhi, the 9th August, 1988

ORDER

In recent years, civil aviation in India has made rapid growth. The development of this mode of transport is, however, capital intensive. Having regard to the constraint of resources it is, therefore, essential that the sector, by and large, is self reliant.

2. The structure of fares and freight rates and pricing of infrastructure facilities have an important bearing on the viability of the civil aviation. However, tariffs charged are often not cost oriented. At the same time, air transport infrastructural facilities are also being partly subsidised.
3. In view of the foregoing it has been decided to constitute a Committee to make a comprehensive examination of domestic air fares and freight rates and pricing of infrastructure facilities.
4. The composition and terms of reference of the Committee will be as follows:

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| 1. Dr. Vijay Kelkar
Chairman, Bureau of Industrial
Costs and Prices | Chairman |
| 2. Shri K.L. Thapar
Principal Adviser (Transport and
Tourism), Planning Commission | Member |
| 3. Prof. U. Shankar
Professor of Econometrics
Madras University, Madras | Member |
| 4. Prof. S. Chakravarty
Indian Institute of
Management, Calcutta | Member |

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| 5. Shri B.K. Mangaokar
Director (Commercial)
Air India, Bombay | Member |
| 6. Shri R. Prasad
Dy. Managing Director
Indian Airlines | Secretary |

Terms of Reference

- (1) To examine the present tariff structure of domestic air carriers and infrastructure facilities and recommend a rational framework for revision of tariffs, both for passenger and freight, keeping in view the service and other considerations including special importance of air transport in certain remote and backward areas;
 - (2) To identify services which are not able to meet the cost of service and to recommend restructuring of routes;
 - (3) To recommend eligibility criteria for grant of any direct subsidy for loss making services otherwise considered essential to operate; and
 - (4) Any other matter relevant to the above issues.
5. The Committee in the course of its work will undertake costing of the domestic aviation system and also establish productivity norms to determine the price structure that will help to generate adequate resources for the development of the sector.
 6. The Committee may co-opt any other Member for its work. It may also get studies on relevant aspects carried out by expert bodies and/or engagement of Consultants, as considered necessary.
 7. The expenditure in connection with the work of the Committee and the secretarial services will be provided by Indian Airlines.
 8. The Committee will submit its report by the end of February, 1989.

Sd/-
(J. C. Dangwal)
Director Administration