CHAPTER 6

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SUMMARY AND CONCLUSIONS

Despite the crucial role of commercial domestic civil aviation in economic development of a country, it has not yet stabilised itself on strong financial footing in India. From its inception in 1911 till now, there has been no systematic trend in its profitability. The performance of the Indian Airlines, which constituted a virtual monopoly till 1990 over the commercial domestic air transport services and even now holds the major share in the market, has fluctuated widely even after so many years of its nationalisation. There have been frequent imbalances in demand and supply of the air services in the past. The cost control measures adopted by the Indian Airline have not been complete and sufficient.

The studies on commercial domestic air transport of India are limited and are mostly done by various government committees from time to time. The studies available have focussed on various problems of the Indian Airlines in isolation and have not made attempt to derive various economic characteristics of the airlines, such as economies of scale, elasticities of substitution between different factors, price elasticities of demand for these factors, technical change, profitability function etc. of the Indian Airlines, which are so important in policy decisions.

In view of these problems, therefore, the main aim of this study was to make an analytical assessment of deficiencies in the domestic civil aviation industry of India. However, due to non-availability of data of private airlines, the analytical assessment had to be confined to the Indian Airlines only. The analytical assessment of the Indian Airlines was carried out by scrutinising the behaviour of revenue, cost and profitability. Due care has been taken to assign sound quantitative and theoretical base for estimations related to each of these variables towards greater accuracy of results. The various empirical analyses undertaken in present research work reveal vital measures that could be taken for efficient operation of the Indian Airlines.

The present chapter briefly summarises various facets of the study and provides a broad overview of the implications emanating from various empirical analyses undertaken.

The study begins with an introductory chapter, wherein the significance of civil aviation industry in the economic development of a country like India, is stressed. Besides, the objectives of the present study, the time period and the limitations of the study are discussed here. It also deals with the sources of data and methodology adopted for examining various aspects like revenue, cost and profitability of the Indian Airlines. To provide a justification for the present study, the relevant studies are reviewed in the first chapter.

Chapter 2 commences with a discussion on the evolution of the commercial civil air transport in India. The discussion was divided into pre-nationalisation and post-nationalisation periods. The pre-nationalisation period was further divided into three periods, viz., 1911-31, 1932-45, 1946-52. The post-nationalisation was divided into the periods before and after the beginning year of present study (1964-65). An overview of the performance of the Indian Airlines after nationalisation is also discussed in this chapter with the help of some financial and physical indicators.

India is the first country in the world to start a commercial airmail flight, when on 18 February, 1911, Monseigneur Piguet flew the airmail from Allahabad to Naini. However, in spite of this distinction, up to the year 1931, there was not significant progress in the development of domestic commercial civil air transport. In the year 1932, after much insistence, Nevill Vintcent and J. R. D. Tata were allowed to start commercial air services (Tata Sons Limited) without any financial support from the government. In the year 1933, one more important airline 'Indian National Airways' came in the scenario, introduced by Goven Grant. Some more airlines came to join the market before the World War II, but they had to leave no sooner had they entered due to financial losses. In period 1932–39 only Tata Sons Ltd. and the Indian National Airway did well, which were mainly engaged in transporting airmails across the Indian states brought by the Imperial Airways. These two airlines were, however, badly affected with commencement of World War II. Gradually, all the internal services were suspended to divert the men, materials and aircraft for war purposes. After war, a 'Reconstruction Committee' was formed in

1944 to assess the needs for internal and external services. Following the recommendation of the Committee 'Air Transport Licensing Board' was created in the year 1946 with a view to regulate schedule services. However, the board was excessively liberal in granting licences, which led to flood of airlines in the industry. The competition among too many airlines for meagre traffic and political partition of India were amongst the main factors, which resulted into turmoil in the airlines industry. The government made may efforts to bring stability in the airlines industry, but it failed for one or the other reasons. Finally, in the year 1950, it set up an 'Air Transport Inquiry Committee' which was to advice on reorganising the air transport system in India. The Committee, after discussing pros and cons of nationalisation, gave freedom to the government to decide whether to nationalise the airlines industry or not. In March 1953, the government passed the Air Corporation Act, which allowed the provision of two statutory corporations; Indian Airlines for domestic and Air India for international services. The Indian Airlines was formed by merging eight of the previous airlines, while the remaining one Tata Sons Ltd., which had converted itself to 'Air India' Public Limited Company in 1946, remained 'Air India' after nationalisation.

In post-nationalisation period, the Indian Airlines had virtual monopoly over the domestic civil air services until the year 1990. In the year 1991, the Indian Airlines was de-monopolised under the 'Open Sky Policy' of the government. With this, many private Airlines started entering the market and competing with the Indian Airlines. However, due to lack of experience and finance, and also due to restrictive

practises of the government, which regulated these airlines, some of these airlines had to face financial losses, resulting in their exit. In the year 1993-94 the share of private airlines in the market was 36.3 per cent in the market, which has remained more or less at the same level in recent years also.

The performance of the Indian Airlines improved considerably during the period 1953- 64. This rate of improvement, however, could not be maintained consistently over the whole study period of present work. When the study period was divided into two equal halves, it was noted through various indicators that the Indian Airlines performed better in first half than the latter. This was mainly because the financial performance of the Indian Airlines deteriorated continuously from the year 1989-90. There are various factors that were responsible for this. The government, to enquire the causes of this financial trouble and suggest appropriate measures, formed the Kelkar Committee in the year 1995. The main suggestion of the committee was-with regards to the two-phased financial strategy. Phase I (1996-97 to 1998-99) was to strengthen the condition of the airlines with the injection of Rs. 920 crores from the government, airlines itself and the employees. In Phase II (1999-00 to 2002-03), the Indian Airlines was to be in a position to make a public offering of its shares. In the matter of share holding, the committee stated that before the end of this decade, the Indian Airlines should be allowed to bring down the state's equity to 49 per cent.

Chapter 3 analyses the different aspects of revenue of the Indian Airlines. This chapter examines whether a public enterprise, like Indian Airlines, should aim at profit making or some other objectives; and it was concluded that public enterprises should work with the dual objectives of making profit and providing public satisfaction. As the revenue is determined by price and quantity sold, a detailed analysis of these is undertaken.

Before examining the price policy for the Indian Airlines, a theoretical background for pricing in context to the public enterprises was discussed. Out of all the pricing methods, marginal cost pricing can be considered the best for public enterprises, as this leads to maximisation of the net welfare of the society. However, this pricing method results into deficit in cases of decreasing cost industries. To overcome the problem of deficit, a second best pricing rule is suggested which includes two part / multi part tariffs.

In airlines, per unit cost falls sharply with the increase in the haul of services. Thus, if marginal cost pricing is followed, it will result into deficit, which calls for the need of following the second best pricing rule. The 'Air Tariff Committee Report' (1989), following this rule, arranged the output of the Indian Airlines in ascending order and divided it into several blocks. Considering each block as a unit, the long run marginal cost for each block was estimated. The 'Air Tariff Committee Report' then suggested charging the corresponding long run marginal cost from each block, which is the average cost of producing the output of respective blocks.

It is expected that the implementation of fare structure suggested by the 'Air Tariff Committee Report' would make the Indian Airlines self-reliant financially and avoid cross subsidisation between short haul and long haul services. Further, this will encourage the entry of private airlines to compete with the Indian Airlines at the level playing field, which will improve the quality and stability of output. On the other hand, following the long run marginal cost-pricing rule takes care of the interest of consumers also. Thus, the implementation of Price Structure suggested by the 'Air Tariff Committee Report' is vital.

With a view to identify and quantify the main factors affecting the demand for Indian Airlines services, demand functions are also estimated. The total demand for the Indian Airlines services consist of passenger demand and cargo demand. As the factors determining passenger demand are different from those determining the cargo demand, separate analyses are done for these two classes of services.

The Tata Economic Consultancy Services (1986) estimated demand functions for passenger and cargo services separately. In passenger demand function, their model included foreign tourist arrival and gross domestic product as independent variables. This model was criticised on the ground that it did not include supply and yield as independent variables. Inclusion of these two variables, it was argued, would have provided a tool for taking internal decisions and determining growth targets. In chapter 3, therefore, an attempt was made to include these two additional variables in passenger demand function models. In cargo demand function of Tata Economic

Consultancy Services, only two variables - cargo yield and trend variable 'T' - were found explaining the demand. Following the logic adopted in passenger demand function, in cargo demand function analysis also attempt was made to incorporate cargo yield and supply factor in the models.

The alternative passenger demand functions are estimated with gross domestic product (GDP) and per capita income (PCI), as alternative determinants. These two alternative demand functions are estimated for output in physical and monetary terms separately. Two cargo demand functions are estimated with GDP and index of industrial production (IIP) as alternative determinants. These demand functions are estimated for output in physical and monetary unit. The 'Ordinary Least Square Technique' was used to estimate these functions.

Passenger demand function analysis revealed that demand for Indian Airlines services are inversely related to the price and they are relatively inelastic. Thus, by increasing fare, the Indian Airlines can benefit financially, until the demand becomes elastic. Increase of real GDP and per capita income both have positive effects on demand for passenger services; and the effect of increase of per capita income is larger than the same of increase in GDP on passenger demand. The coefficients associated with available seat kilometre (ASK) were relatively large, indicating a need for expansion of commercial air transport service in the country. Services should be expanded by exploiting routes with low traffic. On such routes, aircrafts with a capacity of about 50 passengers can be used. This calls for the need

of buying new aircrafts of smaller size too. Foreign tourist arrival as a variable could not be included in the model in view of its poor 't' statistics. This may be due to the supply constraint. Foreign tourist arrival may have influenced more to the potential demand than to the actual demand of the Indian Airlines services.

The analysis of cargo demand function, like passenger demand analysis, also revealed a negative relationship between the demand for cargo services and freight rate. However, in this case, the demand was relatively elastic to the change in price. This was expected in view of the alternatives available in terms of other modes of transport. Thus, the result suggests that Indian Airlines need to reduce the cargo carriage rate for better performance. Analysing the separate effects of GDP and Index of Industrial Production (IIP) on demand for cargo services, it was found that GDP is more closely (positive) related to demand than the IIP. The coefficients associated with available ton kilometre (ATK) are relatively large, speaking of a need for expansion of cargo services also. There has been a negative trend in demand for cargo services. Thus, the Indian Airlines needs to reverse this trend by lowering cargo rate and increasing the supply of freight services.

Chapter 4 deals with the analysis of costs of the Indian Airlines. The concept of duality has been utilised to derive the technological characteristics of production from the cost function. In cost function, while input prices and output are assumed as exogenous variables, input quantities and total cost are endogenous variables. As the Indian Airlines faces a situation where output and input prices are exogenous

and input quantities and total cost are endogenous, a cost function for the Indian Airlines is estimated. In this chapter, while providing a theoretical background, duality, specification of cost function, structure of cost function, economies of scale, elasticity of substitution, price elasticity of demand and a measure technical progress are discussed. Thereafter, on the basis of theoretical background, this chapter defines a set of methodology adopted for various estimations in terms of translog cost function. The translog functional form is considered good, as it places no *apriori* restrictions on substitution possibilities. A number of restrictions can be imposed on the model and validity of the same can be tested statistically. It also allows scale economies to vary with the level of output. In order to improve the efficiency of the estimate, translog cost function has been estimated along with the share equations However, as the shares always sum to unity, it leads to the problem of singularity in the disturbance covariance matrix. To overcome this problem, following the conventional approach, one of the share equations (materials' share equation) was arbitrarily dropped from the models and the remaining were estimated along with the total cost function with the help of Maximum Likelihood (ML) technique.

Two alternative cost function models were estimated with available ton kilometre and revenue ton kilometre as measures of output. This was done keeping in mind the different implications of the two results. All costs of the Indian Airlines were classified as to fall under one of the following heads: labour, capital, energy (fuel), and materials. Accordingly, four prices; price of labour, price of capital, price of

energy and price of materials entered in the cost function analysis. In order to assess the effects of technical change on costs, a time trend variable 't' was also incorporated in the models.

On the basis of the Likelihood Ratio Test (LRT), non-homothetic translog functions were preferred to some other restrictive versions of translog cost function for both the models. Analysis of economies of scale with respect to service provision showed that there are slight economies of scale in production. However, with the entry of private airlines in the industry, the degree of such scale economies has fallen in the last few years of the present study period. This reduction in scale economies can also be attributed to the fact that the reductions in output have not been followed by reductions in costs. Therefore, there is ardent need to cut costs, as even at smaller levels of output, the Indian Airlines can enjoy the economies of scale. The analysis of scale economies with respect to revenue ton kilometre as a measure of output suggested scale diseconomies, which suggests a need to cut down the short haul services.

Various elasticities of substitution and price elasticities of demand have been measured with revenue ton kilometre output only, as the available ton kilometre as a measure of output violated the positivity condition. The results of elasticity of substitution showed complementarity between capital and labour, capital and energy, labour and energy, and capital and materials. The complimentarity between capital and labour suggests a need to reduce the excess staff while the same between

capital and energy and capital and materials suggest a need to replace old aircraft with the new fuel efficient ones. The result also showed substitutability between energy and materials and materials and labour. This suggests that increase in material expenses would be fuel as well as labour saving.

The own price elasticities of demand for the four factors of production are also estimated in the analysis. Price elasticities of demand for labour and energy are weak This indicates rigidity in the employment of these factors, irrespective of their prices; a common phenomenon in most of the public enterprises. The own price elasticity of demand for materials is, however, less inelastic. In case of capital input, the own price elasticity of demand is positive, which is inconsistent with the economic reasoning, indicating inefficiency in the employment of capital. Analysis of technical change was not undertaken in view of the poor t–statistics associated with time trend variable 't'.

Chapter 5 discusses the over all performance of the Indian Airlines in financial and physical terms. Before the discussion on financial performance of the Indian Airlines, various related financial concepts are defined. Physical performance was measured in terms of utilisation of labour, energy, capital (aircraft seat) and materials. Then, attempt was made to identify main determinants of profitability and estimate a quantitative relationship between the profitability its major determinants. Thereafter, the results and implications of profitability function are discussed.

Depending upon the purpose and the availability of data, the financial terms can be defined in a number of ways. Gross profit for present work was defined as the profit comprising of interest charges (short and long term both), provision for taxation, dividends, retained profit and other non-operating expenses but net of depreciation charges. Net profit, on the other hand, was defined as gross profit net of interest charges and taxation. The total capital employed was defined as net fixed assets plus total current assets. Net worth was defined as the equity paid up capital plus reserves and surplus less accumulating losses.

The financial performance as reflected by gross profit was relatively better during 1974-75 to 1987-88, when it kept on improving. However, thereafter, it deteriorated consistently Net profit in the period 1975-76 to 1988-89 was positive with just two exceptions Return on capital employed was highest in the year 1984-85, when it was almost 15 per cent. In the period between 1975-76 and 1987-88 only, it was above 9 per cent with just two exceptions. Return on networth in between 1975-76 to 1988-89 only was above 10 per cent, with two exceptions again, and this was the highest at 24 per cent in the year 1983-84. Assessing the physical performance in terms of utilisation of various factors, it was noted that over the study period, productivity of each factor considered, showed a trend of improvement.

For the estimation of profitability function, the selected model consisted of profitability (profit as a percentage of capital employed) as a dependent variable and gross profit margin, sales turnover ratio, labour output ratio, yield and the level of

output as independent variables. An ordinary least square technique was used to estimate this model. The estimated model showed that 1 per cent increase of profit margin would lead to almost same per cent increase of profitability of the Indian Airlines Similar high positive relationship was also noted between profitability and sales turnover ratio. Relationship between profitability and labour output ratio indicated that a reduction of this ratio would lead to an increase in profitability of the Indian Airlines by about 0.4 per cent. In view of the privatisation of Indian Airlines, this ratio would play an important role in increasing the profitability. The analysis also revealed a scope of increasing profitability by increasing yield. The negative sign associated with available ton kilometre indicated a negative relationship between profitability and output produced. This is in spite of the fact that there is scale economies with respect to available ton kilometre as a measure of output, as was revealed by chapter 4. Thus, the technical economies have not been materialised by the Indian Airlines. This is evident from the fact that there are diseconomies of scale with respect to revenue output as was noted in chapter 4. This again speaks of a need for cutting down the short haul service and increasing passenger fares.

To conclude this study, the following broad policy implications, which emerged from the various analyses, can be mentioned:

- There is need for application of second best pricing rule - multi part tariff – as suggested by the 'Air Tariff Committee Report' for the pricing of the Indian Airlines services.
- For revenue maximisation, there is need to increase the passenger fare and reduce the freight rate. Further, an increase in freight output is also needed.
- The augmentation of the overall capacity output is required from time to time.
- Short haul services need to be curtailed to as little as possible, particularly on the routes having poor load factor.
- New fuel-efficient aircrafts, particularly with smaller seat capacity to take care of the routes having poor load factor, need to be inducted in the Indian Airlines.
- A cut in the number of employees of the Indian Airlines is also needed for better profitability.
- Expenses on materials (like maintenance, aircraft spares, general tools, ground support equipment etc.) should be increased as it is both labour as well as fuel saving.
- Flexibility in the substitution of factors, such as employees, capital, fuel and materials, is required in order to minimise the cost of production for a given output.