Fare Structure of the Public Bus System In the Four Super-Metropolitan Cities Of India, 1985

Research Study Number 84

National Institute of Urban Affairs
1st & 2nd Floor, Core 4B, India Habitat Centre, Lodhi Road,
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RESEARCH REPORT 1

TRANSPORT RESEARCH CELL
NATIONAL INSTITUTE OF URBAN AFFAIRS

FARE STRUCTURE OF THE PUBLIC BUS SYSTEM IN THE FOUR SUPER-METROPOLITAN CITIES OF INDIA

by

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PREFACE

In recognition of the vital role that transport plays in the development process in general and the crucial bearing it has on urban living in particular, the National Institute of Urban Affairs (New Delhi) organised the Transport Research Cell as an integral part of its overall programme of urban and regional research in August, 1984. An active patronage of the Secretary, Ministry of Shipping and Transport, and the initial incentive and economic support from the Executive Director, Association of State Road Transport Undertakings, have been instrumental in establishment and growth of this Cell. It has been entrusted with the responsibility of undertaking research studies on problems relating to urban transport in the overall context of socio-economic development in the country.

Among the various issues which are of direct concern to the transport administration as well as the public at large, the one relating to the fare structure of the public transport services is of paramount importance. This is particularly true of the metropolitan mass transport which affects the daily life of millions of commuters. It is for this reason that the Transport Research Cell decided to devote its first study to the faring system of the public bus service in the four super-metropolitan cities of India.

Fixing of fares of any mass transport system is just not a simple matter of striking a balance between the cost incurred and revenue raised. Any fare structure, as this report demonstrates, has a far reaching impact on the degree of social welfare, intensity of

commuters' mobility, modal split of transport, land use pattern, level of pollution, and operational convenience, in addition to amount of revenue earned. As such, the recovery of cost incurred cannot be the sole consideration in fixing of public transport fares.

At the same time, the public transport system cannot be subsidised to a degree that it becomes highly inefficient and eats a large slice of resources which are to be spread over a number of services. Then where is the optimal line between the considerations of revenue and of social welfare? This is an issue for serious research. A survey of the current situation is a pre-requisite for this.

This is what this report has tried to do. It takes a comparative view of the public bus fares and the degree of subsidisation involved in the four super-metropolitan cities of India. The main strength of this report lies in not only laying bare the public bus fare situation in the four cities but also in highlighting the consequences of any change therein.

I would like to place on record my deep appreciation of the efforts made by the members of the team, Professor Gopal Krishan, Ms. Indu Patnaik and Mr. Rajesh Chandra, in accomplishing this very useful study.

May, 1985

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CONTENTS

FARE STRUCTURE OF THE PUBLIC BUS SYSTEM IN THE FOUR SUPER-METROPOLITAN CITIES OF INDIA

The Objective

This report presents a comparative picture of the fare structure of public bus system in the four super-metropolitan cities of Calcutta, Bombay, Delhi and Madras. Fare structure of both ordinary and de luxe bus services has been analysed. An overview of the bus fare in some cities of both developed and developing countries has also been taken.

The primary objective is to identify the differences in faring system of the public bus service in the four cities. Which city provides the cheapest bus service and which makes the costliest demands on its commuters? What is the extent of the variation in minimum and maximum fares in each case? What is the pattern of distance slabbing for realisation of bus fares in different cities? How wide is the gap in the cost of ordinary and deluxe bus service for the commuter? Is there any relationship between the cost and revenue of the public bus service in four cities under reference? These are the main questions which have been examined in this report. As a necessary background, the analytical part of this report is preceded by a brief discussion on the four cities. Issues relating to urban transport system in general, fares and fare structure, and fare rationalisation have also been looked into.

The Four Cities

a. Population and area: A population of one million qualifies an Indian city to have the status of a metropolitan city. As per the 1981 census, India has twelve metropolitan cities of Calcutta, Bombay, Delhi, Madras, Bangalore, Hyderabad, Ahmedabad, Pune, Kanpur, Nagpur, Jaipur and Lucknow.

The four cities, covered under the study, have a population of over four million each. Calcutta recorded a population of 9.2 million, Bombay of 8.2 million, Delhi of 5.7 million, and Madras of 4.3 million (Table 1). It is for this reason that these four cities have been designated as super-metropolitan.

Table 1: Population and Area of the Four Super-Metropolitan Cities in India, 1981.

City	Population	Area (in sq. kms.)
Calcutta	9,194,018	852.23
Bombay	8,243,405	603.00
Delhi	5,729,283	540.74
Madras	4,289,347	571.93

Source: Census of India (1981): Primary Census Abstract Population, Part II B(i), PP 300 - 301, 656 - 57, 594 - 95, and 632 - 33.

These cities occupy extensive areas. Calcutta recorded the largest physical size of 852 $kms.^2$, followed by Bombay of 603 $kms.^2$, Madras is spread over 572 $kms.^2$ Delhi is relatively small, with a territorial jurisdiction of 451 $kms.^2$ only (Table 1).

Calcutta, Bombay, Delhi and Madras enjoy a position of pre-eminence in urban hierarchy. Calcutta, Bombay and Madras are not only the three biggest ports of India but also the capitals of their respective states. Delhi is, ofcourse, the national capital.

b. Transport scenario: By virtue of being large in both population and area, and being prime centres of administration, trade, industry and services, the four super-metropolitan cities involve massive intra-city movement of people. This movement originates not only from different points within but also from outside. Each of these cities receives millions of commuters and visitors who come for a variety of purposes. The transport system has to cater to both local and non-local population.

Some other features of transport in the super-metropolitan cities may also be noted. Firstly, the vehicle mix presents a great variety in size, shape and speed. Part of it is complementary and part competitive. One of the main tasks for metropolitan transport planning is to make the mix as complementary as possible. Secondly, the volume of traffic in these cities is increasing fast with their rapid growth of population, regular enhancement in vehicle ownership rate, and fast expansion of physical size. Provision of transport facility in peripheral localities, though desired, leads to further sprawl of the cities. The metropolitan cities, as such, face an additional problem of striking a balance between their land use and transport planning. Thirdly, the bulk of traffic in these cities is uni-directional, toward work or residential areas, during peak hours. This is, of course, a worldwide phenomenon but gives rise to a special concern in developing countries where transport mix is much more

varied and traffic sense is yet to mature. Above all, an overwhelming majority of the commuters in the metropolitan cities belongs to low income group. Their capacity to pay for the travel service is limited. Hence, the public transport has to be subsidised, generally to a high degree. One of the major concerns of the public transport system in these cities is to raise the requisite revenue to meet their ever growing deficits.

c. Organisational Structure: The organisational structure of public bus service in the four super-metropolitan cities also displays some notable differences. Calcutta and Delhi are served by transport corporations. However, while the Calcutta State Transport Corporation is the responsibility of the State Government, the Delhi Transport Corporation is under the Central Government. The Bombay Electric Supply and Transport (B.E.S.T.) is an autonomous body. It, however, pays a statutory contribution to the municipal corporation, and is deemed as functioning under it. A part of the metropolitan bus service in Bombay is provided by the Bombay Metropolitan Transport Company. Such companies are looked after by a Board of Directors appointed under the Companies Act. In Madras, the metropolitan transport service is provided by the Pallavan Transport Company. These differences in organisational structure have a bearing on the revenue raising efforts and sources of financial assistance of the various transport corporations/undertakings/companies. Corporations and undertakings have a greater access to the government funds while the companies enjoy greater freedom in fixing bus fares to raise the necessary revenue.

d. Modal split of commuters: Table 2 presents the distribution of commuters by the mode of public transport they use in the four super-metrpolitan cities. The data pertain to the year 1969. The situation should have considerably changed since then. However, some idea about the relative significance of different modes of public transport can be gleaned from them.

In Delhi, bus transport is of overwhelming importance. It shared no less than 96 per cent of the commuters travelling by public transport system. In Madras also, the bus transport carried more than three-fourths of the commuters. In Bombay, the commuters by bus and suburban rail were roughly equally divided. In Calcutta, trams were a close second to the buses and together these accounted for three-fourths of the total commuters.

Table 2: Modal Distribution of Commuters by Public Transport in Four Super-Metropolitan Cities, 1969

Mode	Percentage to total commuters in			
	Calcutta	Bombay	Delhi	Madras
Bus	40	45	96	77
Suburban railways	25	55	4	23
Trams	35	-	-	-
	100	100	100	100

Source: Association of the State Road Transport Undertakings: Working Paper No. 23, Table 7.

Table 3: Trends in Modal-Split of Commuting in Delhi, 1957-1976

Mode of commuting	Percentage of trips in		
	1957	1969	1976
Bus	22.04	39.57	51.05
Bicycle	36.00	28.01	22.01
Scooter/motor cycle	1.00	8.42	10.07
Private car	10.01	10.64	4.02
Scooter rickshaw	4.00	3.55	2.01
Rail	0.04	1.23	1.07
Taxis	4.04	1.16	1.01
Institutional vehicles	-	4.90	6.06
Others (cycle rickshaw, tongas, four/six seater rickshaw, etc.)	22.87	2.52	2.70

Source: Delhi Development Authority (1982): Seminar on Transportation, Delhi 2001, p.10.

Data presented in Table 3 for Delhi is illustrative of the changes in the modal split of the commuters in such cities during the recent years. The most notable trends are : (1) a rapid increase in the use of bus service, (ii) growing dependence on institutional vehicles, mainly cars and buses, for commuting, (iii) a significant decline in the use of personalised transport modes, such as bicycles and private cars, but a rise in the use of scooters/motorcycles, (iv) a gradual fall, relatively speaking, in hiring of intermediate public vehicles, such as scooter rickshaws and taxis, and (v) continuing low incidence of rail use. This is not to deny an absolute increase in the number of practically all modes of travel, barring

perhaps tongas, on Delhi roads. The bus has emerged as the dominant mode of intra-city commuting over the decades. Commuting by rail has not picked up. Most of the personalised and intermediate transport vehicles are now relatively less in use. All this points to the vital role which bus service is going to play in Delhi for a long time to come.

Urban Transport System

Any urban transport system has three components: mass transport by road, rail and water; intermediate public transport by taxis, autorickshaws, tongas, and cycle rickshaws; and personalised transport by car, motorcycle, scooter and bicycle.

The public bus transport is of overriding importance in Indian cities. Table 4 shows that over ten thousand buses in the four metropolitan cities carry about four billion passengers in a year. In Delhi, 83 per cent of the commuters travel by bus. (Maunder and others, 1981, p.3). If only the public transport system is taken into account, this percentage rises to 96, as noted earlier in Table 2.

The most crucial role of the public bus service lies in linking the living places with work areas. In Delhi, 65 per cent of all bus journeys are for work, 4 per cent for education, 18 per cent for shopping, social interaction and leisure, and the remaining for miscellaneous purposes (Maunder and others, 1981, p.11).

Table 4: Number of Buses and Passengers in Four Super-Metropolitan Cities of India, 1982-83

City	Number of buses	Number of passengers in million
Calcutta	1,141 *	314
Bombay	2,291 **	1,328
Delhi	4,044 ***	1,254
Madras	2,103	934

Source: Central Institute of Road Transport (1984): Performance Statistics of State Transport Undertakings 1981-82 and 1982-83, Pune, pp.15-19 & 118-120.

* Calcutta has a large fleet of private buses also, the size of which could not be ascertained.

** This figure is for the B.E.S.T only. An additional 200 buses are run by the Bombay Metropolitan Transport Corporation Ltd.

*** This figure excludes 801 private buses which operate under the Delhi Transport Corporation.

For that reason, the bus service has to be efficient, adequate, economical and properly consolidated, as envisaged for the Delhi Transport Corporation at the time of its formation in 1971. The efficiency, quality and adequacy are contingent upon the resources available. The availability of resources for a public bus service is normally dependent on the revenue it can raise through its faring system. A comprehensive understanding of the fare structure of the public bus system is, therefore, a key to the operational rationalisation of the transport undertakings.

Fares and Fare Structure

Fare is the price paid for transport services availed of by individuals (Sampson and Farris, 1979, p.154). Fare structure refers to the system of fares as adjusted to distance slabs of journey, quality of service provided, time and day of travel, nature of journey route (hilly or plain), and such other relevant matters.

The Director, Central Institute of Road Transport, Pune in his letter dated 18.1.1984 to the Executive Director, Association of State Road Transport Undertakings, New Delhi, stated that the fare structure lays down different fare charges based on:

(i) length of journeys,

(ii) type of roads, such as metalled and unmetalled,

(iii) kind of topography, plain or hilly,

(iv) quality of service, such as ordinary, express, luxury/deluxe, air conditioned and excursion, and

(v) time and day of operations, such as night services or holiday special.

The various items listed above are detailed below :

(i) Length of Journeys: The fare charged is understandably a function of the distance travelled. However, the fare rate is generally constant or regressive. In the first case, it maintains a uniform rate for any distance. In the second case, it decreases with increasing distance. The intention is to give some concession to the long distance commuters. The urban transport organisations normally charge fares adjusted to distance slabs. The number of distance slabs is generally kept small. This makes the fare structure simple to understand and convenient to operate.

Type of Roads: The operational cost of motor vehicles vary with the type of roads on which they move. The metalled roads allow faster travel and involve less wear and tear as compared with the kutcha roads. The bus fares are understandably higher on the latter.

(iii) Kind of Topography: Hill roads are heavy on petrol. They also take a longer time to negotiate an equivalent distance vis-a-vis thier counterparts in the plain. To recover higher costs, the bus fares are invariably higher in hill areas.

(iv) Quality of Service: The operational costs differ also with the degree of comfort provided. The luxury or de luxe buses cost more. Their intake or overloading capacity is less. This constrains their ability to raise extra revenue. For these reasons, among others, de luxe services are priced much higher than the ordinary. Sometimes de luxe buses are run with a view to making up for a part of the losses on ordinary buses. The de luxe buses are more suited to relatively long distance commuters who are eager to buy travel comfort.

(v) Time of Service: The fare is determined also in the light of the time at which the travel service is provided. The late night services are generally expensive because the crew have to be compensated. Also revenue itself has to be made up for as fewer commuters travel during late night hours. In some cases, lower rates may be charged for off-peak hours as an incentive to avoid commuting during rush hours. Higher rates may also be charged for services provided at special occasions.

Other Factors: In addition, there are some other factors which are taken into account while fixing the fares. Firstly, certain categories of people, such as children, students and the aged, may be allowed to travel at concessional rates. Involved herein is a strong element of social welfare. Regular and frequent commuters can also avail of the facility of concessional passes on weekly, monthly or quaterly basis. Round trips may be charged at lower rates. All this is both economical and convenient to the commuter. The service agency also derives the satisfaction of meeting its special obligations.

Secondly, the origination and destination points may be considered while fixing fares. Buses originating from air port, railway station or city bus stand may charge higher rates. The commuters by these buses reconcile to a higher bus fare because their trade off with the intermediate public transport, such as taxis or autorickshaws, is very favourable. Higher fares may be charged by buses going to the city centre during the peak hours. This may encourage staggering of office hours by the employers or may even impel relocation of offices in other parts of the city.

Normally, the primary considerations involved in fixing fares or designing fare structure are the recovery of cost and convenience in realisation of the fare amount. The governing philosophy of the agency providing the service is also of paramount importance. Does it view the public bus transport as a commercial enterprise or a social service? Does it feel concerned about the impact of its fare policy

on the land use pattern and transport mix in the city? Is it susceptible to the pressure of vested interests in retaining the fares at low level despite the heavy losses? Answer to these and many other questions will determine the level at which the fares are pegged.

Fig. 1 summarises the goals, consequence variables and ultimate effects of the metropolitan public bus fares. The primary goals include recovery of cost, social welfare, and mobility of commuters. The secondary goals relate to the desired kind of modal split of transport, land use pattern and environmental quality. The level of bus fare, high or low, has its own bearing in each case. Thus the fixation of metropolitan bus fares will be guided by a mix of considerations, with pre-determined priorities, relevant to a given urban system.

Likewise, public bus fare structures influence the revenue, social welfare and operational convenience (Fig. 2). One would enunciate fare rates, minimum fare, maximum fare and distance slabs as the four components of a fare structure. Every one of these has its own distinctive attributes. For example, fare rates could be flat, constant, regressive or progressive. Minimum and maximum fares could be low or high. The distance slabs could be few or many. Each has its own effect on the revenue earned, degree of social welfare achieved, and level of operational convenience attained.

Fig.1

METROPOLITAN PUBLIC BUS FARES

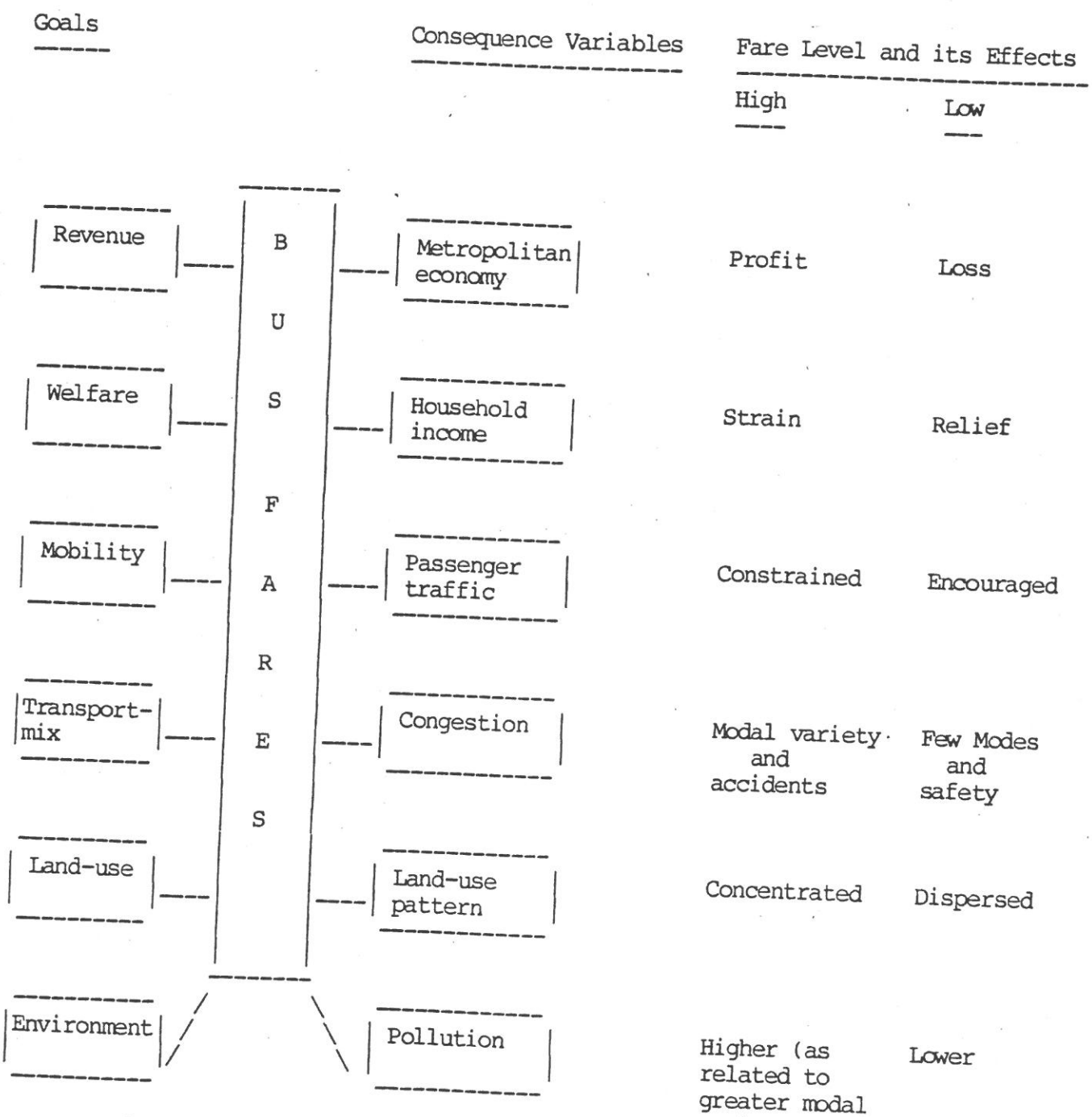


Fig.2

METROPOLITAN PUBLIC BUS FARE STRUCTURES

			Revenue	Social Welfare	Operational Convenience
FARE STRUCTURE	- Fare rate	- Flat	Profit over short distance Loss over long distance	Long distance commuters helped	High
		- Constant	Neutral	Neutral	Neutral
		- Regressive	Loss	Long distance/ poor commuters helped	Neutral
		- Progressive	Profit	All groups adversely affected	Neutral
	- Minimum fare	-Low	Loss	All groups benefitted	Neutral
		- High	Profit	Adverse especially to the poor	Neutral
	- Maximum fare	- Low	Loss	All groups benefitted	Neutral
		- High	Profit	Poor badly affected	Neutral
	- Distance slabs	- Few	Loss	Offer no special benefit to the poor	High
		- Many	Profit	Disadvantageous to the poor	Low

Fare Rationalisation

The preceding discussion brings us to the issue of fare rationalisation. This, however, is a complex matter. In principle, every service, including transport, is supposed to pay for itself. However, the metropolitan transport service, with its overriding effect on all aspects of city life, falls under a special category. If the fares are fixed at a level so as to recover costs fully, these may work out as beyond the paying capacity of most of the city population. These may be particularly hard on the weaker sections of society. Also high fares for public bus service may induce more of personalised transport vehicles, such as cars, motorcycles, scooters and bicycles, to appear on the roads. This would have its own cost in terms of traffic congestion, petrol consumption, and accident rates.

A World Bank study revealed that the total cost per person per mile by car in the developed countries is eight times of that by bus (Table 5). This gap would be wider in the case of developing countries where the load factor per bus is much higher. Thus, the aggregate cost of urban transport for the society will rise enormously if the public bus service gets discouraged by any faring system.

The fare structure exerts a strong influence on the urban land use pattern as well (Figs. 1 and 2). If the fares are pitched high, there would be a tendency for the people to concentrate in localities close to work places. On the other hand, an affordable fare structure would facilitate a dispersed residential pattern in the city. This does help in solving the housing problem.

Table 5: Illustrative Costs of Urban Travel by Different Modes, around 1970

Transport mode	Speed (miles per hour)	Total cost per person per mile (in US cents)
Car with driver only	10	17.5
Taxi with four passengers	12	4.5
Mini bus with ten passengers	10	2.9
Bus with thirty passengers	8.6	2.1

Source: World Bank (1975): Urban Transport Sector Policy Paper, Annexure 5, pp. 74-75.

It is no wonder that the public transport system in metropolitan cities is generally substantially subsidised all over the world. Nevertheless a meaningful equation has to be established between the fare amount and the subsidy rate. The position is likely to differ from city to city within a given country. A comparative view of the prevailing situation will be of great help in this regard.

Bus Fares in Cities: An International Comparison

Before an attempt is made to analyse the fare structure of the bus system in India's four largest cities, it would be worthwhile to examine the bus fare rates and associated features in select cities as belonging to different countries of the world. The necessary data for this purpose are presented in Table 6.

The cities have been arranged in ascending order of bus fare due for a 3 mile or 5 km. trip. All observations below are based on this amount of representative bus fare.

It is obvious from Table 6 that :

(i) The bus fare ranged from around one cent in Karachi to 40 cents in Washington for the same distance slab.

(ii) Bus fares were low in the cities of the developing world : Karachi (one cent), Cairo (2 cents), Calcutta, Bombay and Madras (3 cents each), Jakarta (4 cents), and Kuala Lumpur (5 cents).

(iii) The corresponding fares were strikingly high in cities of the developed world : Washington (40 cents), London and Paris (30 cents each), and Tokyo (25 cents).

(iv) Bus fares were relatively high, for any developing country, in some African cities : Lusaka (10 cents) and Nairobi (10 cents).

(v) On the other hand, bus fares were relatively low in some developed city states : Hongkong (4 to 10 cents) and Singapore (6.5 cents).

(vi) Bus fares were moderate in cities located in the Mediterranean world: Athens and Istanbul (10 cents each).

A deeper perusal of the Table 6 brings forth the following additional points :

(i) Although the city bus fares were exceedingly lower in the developing world than in the developed yet these tended to be higher if an allowance was made for the per capita income in each case. A Washington commuter earned 20 times as much as

his Calcutta counterpart but he was paying a bus fare which was only 13 times as high.

(ii) Some cities in the developing countries were better placed than those in the developed world even on comparable basis. A London commuter's per capita income was 7 times of the one in Bombay but he was paying a bus fare which was ten times as high.

(iii) The developing countries do display striking differences in their city bus fares. Bombay and Karachi were almost comparable in terms of per capita income but the Bombay commuter was paying a three times higher bus fare. Likewise, Calcutta and Cairo had a comparable per capita income but a commuter in the former city was paying a bus fare which was 1.5 times as high.

Table 6 permits formulation of some additional observations :

(i) The bus service was far more frequent in the cities of the developed world than in those of the developing realm. The number of buses per 1000 persons in Bombay was only one-tenth of that in Washington, one-seventh of that in Hongkong and one-fourth of that in London.

(ii) The bus availability situation was comparable in Bombay and Karachi.

Table 6: Bus Fare and Related Data for Select Cities in Different Countries of the World, around 1970

City	Population (in '000) (1970)	Income per capita in dollars (1970)	Number of buses per 1000 population (1970)	Bus trips as % of total motorized trips (around 1970)	Bus fare for a 3 mile or 5 km. trip in cents (1974)
Karachi	3,460	360	0.3	63	1
Tunis	0,746	500	0.5	75	1.5
Cairo	6,500	275	0.3	-	2
Bogota	2,551	760	1.4	71	2.5
Calcutta	7,402	270	0.3	34	3
Bombay	5,792	390	0.3	41	3
Madras	3,438	180	0.6	54	3
Tehran	3,600	950	1.0	42	3 to 8
Dar es Salaam	0,350	710	0.6	40	3.5
Jakarta	4,312	325	1.1	49	4
Hong Kong	3,350	850	2.1	55	4 to 10
Bangkok	3,090	525	1.2	59	5
Abidjan	0,424	500	1.7	47	5
Kuala Lumpur	0,755	660	1.0	35	5
Beirut	0,600	1,000	2.3	10	6
Singapore	2,110	1,000	1.3	43	6.5
Istanbul	2,800	810	0.2	28	10
Athens	2,416	-	2.5	-	10
Nairobi	0,567	495	1.5	28	10
Casablanca	1,505	820	0.4	-	10 to 20
Lusaka	0,225	660	1.1	7	11
Tokyo	14,900	2,775	1.3	8	25
London	10,547	2,550	0.6	24	30
Paris	8,448	3,530	0.4	24	30
Washington	0,757	5,390	2.9	32	40

Source: World Bank (1975) : Urban Transport : Sector Policy Paper, Annexure 2, pp. 68-69.

(iii) Bus trips made nearly one-fourth of all motorised trips in London and Paris, one-third in Washington, nearly one-half in Bombay, nearly two-thirds in Karachi, and three-fourths in Tunis.

Normally the bus fares tended to decline with increasing proportion of commuters making use of this mode of transport.

Fare Structure of Ordinary Bus Services

An analysis of data relating to the fare structure of ordinary bus services in Calcutta, Bombay, Delhi and Madras lays bare some of their essential differences on this count (Table 7).

It is learnt that the fares charged remain the same over comparatively long distances in Delhi and Calcutta. On the other hand, fares are graduated over many short distance slabs in Bombay and Madras (Fig. 3). The former system of fare structure is convenient to operate. It is more favourable to the relatively long distance commuters. The latter system is neutral in its impact on different distance categories of commuters. It yields higher revenue as well.

There is not much variation in the fare for short distance journeys upto 4 kms. The Bombay and Madras commuters pay 50 p. for a distance upto 4 kms., the Calcutta commuter pays 40 p., while the Delhi commuter pays only 30 p.

The medium-distance commuter, going upto 16 kms., in Delhi has to pay the lowest amount of only 40 p. His Calcutta counterpart pays 50 p. His Bombay and Madras counterparts pay Rs. 1.45 and Rs. 1.05, respectively.

In Delhi, a person could travel upto 20 kms. on a 50 p. ticket. In Calcutta, the comparable distance is 17.6 kms. A Bombay commuter could travel only 6 kms. and his Madras counterpart only 4 kms. with a ticket of that denomination.

Table 7: Fare Structure of the Ordinary Bus Services in the Four Super-Metropolitan Cities of India

Distance	Charge in paise in			
	Calcutta (C.S.T.C.)	Bombay (B.E.S.T.)	Delhi (D.T.C.)	Madras (P.T.C.)
upto 1 km.	40	50	30	40
2 kms.	40	50	30	40
3 kms.	40	50	30	50
4 kms.	40	50	30	50
5 kms.	40	50	40	60
6 kms.	40(upto 6.9 kms)	50	40	60
7 kms.	50	75	40	70
8 kms.	50	75	40	70
9 kms.	50	95	40	80
10 kms.	50	95	40	80
11 kms.	50	95	40	90
12 kms.	50	95	40	90
13 kms.	50	120	40	100
14 kms.	50	120	40	100
15 kms.	50	145	40	105
16 kms.	50	145	40	105
17 kms.	50(upto 17.6kms)	145	50	110
18 kms.	60	145	50	110
19 kms.	60(upto 19.6kms)	145	50	115
20 kms.		145	50	115
21 kms.	N.A.	145	75	120
22 kms.		145	75	120
23 kms.		145	75	125
24 kms.		145	75	125
25 kms.		145	75	130
26 kms.		145	75	130
27 kms.		145	75	135
28 kms.		145	75	135
29 kms.		145	75	140
30 kms.		145	75	140

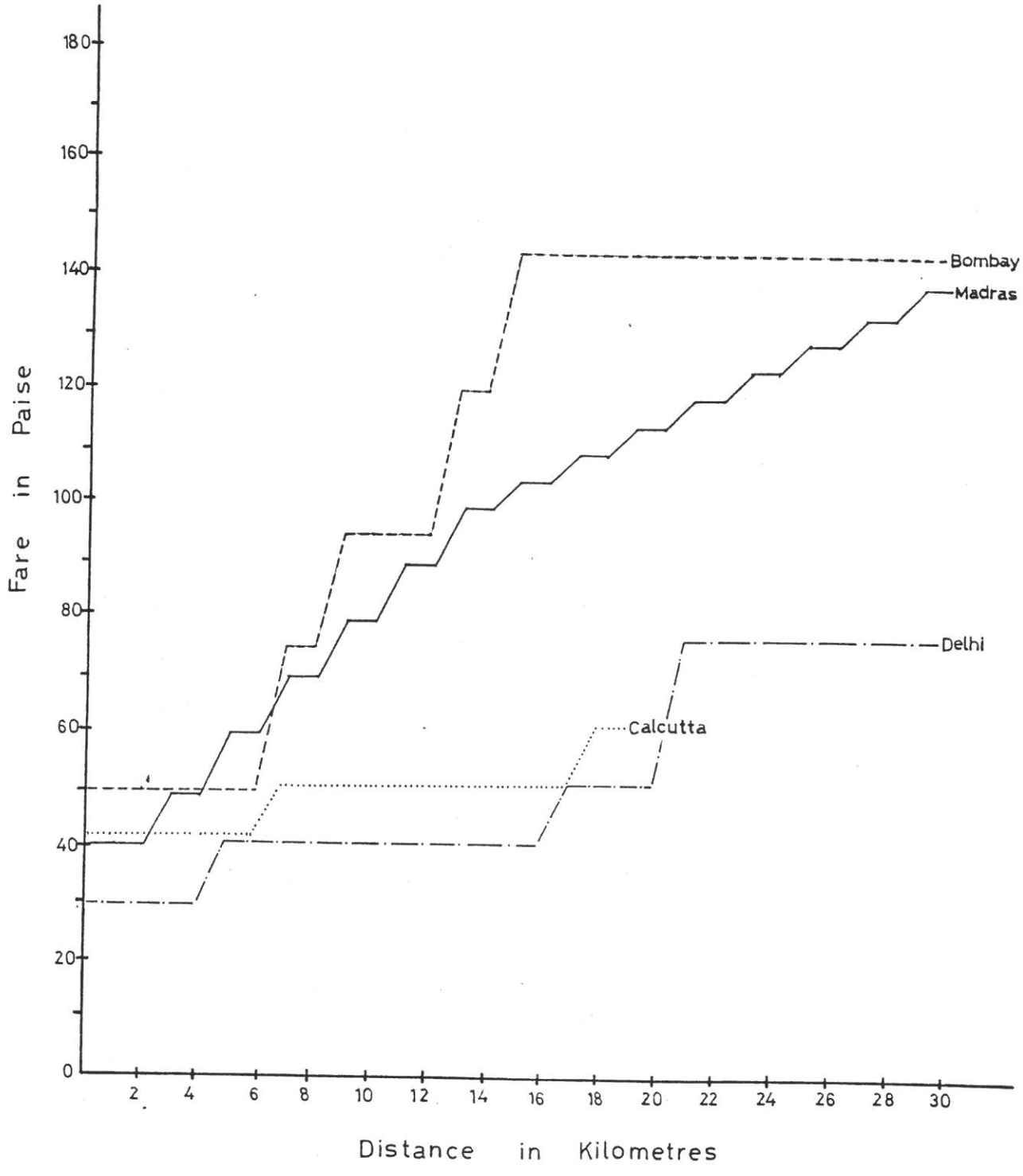
Source: Central Institute of Road Transport (1985): Performance Statistics of State Transport Undertakings, 1982-83 and 1983-84, Pune and Association of State Road Transport Undertakings, New Delhi.

Note: i) No Passenger tax is levied in Delhi and Madras. A passenger tax of 3.5 per cent is included in Bombay fares. It also includes a 5 paise nutrition charge on all tickets of 60 p. and above in Bombay.

ii) The fare structures listed above came into effect on 15.3.1983 in Calcutta, on 14.9.1984 in Bombay, on 22.2.1979 in Delhi and on 1.4.1985 in Madras.

Fig. 3

VARIATIONS IN ORDINARY BUS FARE WITH DISTANCE IN FOUR SUPER-METROPOLITAN CITIES 1985



If a still longer distance of 30 kms. is taken into account, a Delhi commuter is to pay 75 p., a Bombay commuter Rs. 1.45, and a Madras commuter Rs. 1.40. The comparable figures for Calcutta are not available.

Thus, the bus fares are the lowest in Delhi, followed by those in Calcutta, Madras and Bombay in that order. The Delhi commuter is placed favourably in respect of all categories of journey, small (upto 4 kms.), medium (4 to 16 kms.), and long (exceeding 16 kms), His advantage increases with the length of journey he undertakes. This leads to a rapid sprawl of the city. The people can take residence even at a great distance from their work place since the commuting costs remain relatively low.

It is but natural that Delhi Transport Corporation suffers heavy losses every year in its efforts to maintain a highly subsidised fare structure. It is also under constant public pressure not to raise it to a higher level. The indispensability of the bus service for the Delhi commuter, and inevitability of negative consequences for city transport, economy and housing of any rise in payment for this service are duly stressed. But how long can an increasingly subsidised system be sustained? This is a moot question and deserves critical thinking.

Fare Structure of De Luxe/Limited Bus Services

There is a striking difference in the pricing system of de luxe/limited bus services in Bombay, Calcutta, Delhi and Madras (Table 8).

In Delhi, the fare charged is neutral to the distance travelled while in Bombay and Calcutta fares are graded to distance. No regular service of this nature is provided in Madras. However, whenever arranged, special rates are fixed with the approval of the government.

A flat fare of Re. 1/- is charged in a de luxe bus in Delhi, irrespective of the distance travelled. The objective is to generate comfortable travel conditions for the long distance commuter. Short distance commuters generally avoid travelling by de luxe category of buses. The de luxe buses are of special advantage to commuters whose travel distance exceeds 20 kms. They pay only 25 p. more than what they would have paid for a journey by an ordinary bus.

In Bombay and Calcutta, fares are linked with distance. The B.E.S.T. charges a minimum of 50 p. and its Calcutta counterpart 60 p.

The difference in the fare increases with distance in the two cases. For a journey of 15 kms., the Calcutta commuter has to pay Rs.1.70, while his Bombay counterpart pays only Rs.1.45. For a longer journey of 30 kms., the fares are Rs.3.30 in Calcutta and Rs. 1.95 in Bombay.

Table 8: Fare Structure of the De Luxe/Limited Bus Services in the Four Super-Metropolitan Cities of India.

Distance	Charge in paise in			
	Calcutta (C.S.T.C.)	Bombay (B.E.S.T.)	Delhi (D.T.C.)	Madras (P.T.C.)
Minimum fare	60	50	100	Special charges with the approval of the Government
1 km.	60	50	100	
2 kms.	60	50	100	
3 kms.	60	65	100	
4 kms.	60	65	100	
5 kms.	60	75	100	
6 kms.	72	75	100	
7 kms.	84	95	100	
8 kms.	96	95	100	
9 kms.	108	145	100	
10 kms.	120	145	100	
11 kms.	132	145	100	
12 kms.	144	145	100	
13 kms.	156	145	100	
14 kms.	168	145	100	
15 kms.	170	145	100	
16 kms.	182	195	100	
17 kms.	194	195	100	
18 kms.	206	195	100	
19 kms.	218	195	100	
20 kms.	230	195	100	
21 kms.	242	195	100	
22 kms.	254	195	100	
23 kms.	266	195	100	
24 kms.	278	195	100	
25 kms.	280	195	100	
26 kms.	292	195	100	
27 kms.	304	195	100	
28 kms.	316	195	100	
29 kms.	328	195	100	
30 kms.	330	195	100	

Source: Association of State Road Transport Undertakings, New Delhi and Central Institute of Road Transport (1985): Performance Statistics of Sate Transport Undertakings 1982-83 and 1983-84, Pune.

It seems that Calcutta Corporation is less favourably inclined to commuters travelling by de luxe buses. They are supposed to be hailing from comparatively higher income groups. An ideological bias is obvious in this case.

A comparison of fare charged for certain critical distance points in Calcutta, Bombay and Delhi is highly revealing.

For a distance of 3 kilometres, a Delhi commuter has to pay almost twice as much as the Bombay commuter.

Around 8 kms., there is a certain degree of levelling of the fare rates. These are Rs.0.96, Rs.0.95 and Rs.1.00 for Calcutta, Bombay and Delhi, respectively.

For distances longer than this, the Calcutta and Bombay commuters have to pay much more. For a distance of 30 kms., the Calcutta commuter pays thrice as much, and the Bombay commuter almost twice as much as his Delhi counterpart.

Thus, the Delhi commuter pays the least not only for the ordinary bus service but also for de luxe/limited bus service in general. His comparative advantage increases if the journey is undertaken over a longer distance.

In brief:

(i) The distance covered and comfort provided are the two primary determinants of the fare structure of the public bus system in the four cities under study.

(ii) For a short distance commuter of 4 kms., travelling by an ordinary bus, the cost per km. is 12.5 p. in Bombay and Madras, 10 p. in Calcutta, and only 7.5 p. in Delhi. For a medium distance commuter of 10 kms., this cost is 9.5 p. per km. in Bombay, 8 p. in Madras, 5 p. in Calcutta, and 4 p. in Delhi.

For a long distance commuter of 20 kms., the cost per km. is 7.25 p. in Bombay, 5.75 p. in Madras, 3 p. in Calcutta, and 2.5 p. in Delhi.

As such, the Delhi commuter enjoys a double benefit. Firstly, he pays the lowest fare for practically all the distances. Secondly, his travel costs increase at a lower rate for longer journeys.

(iii) The de luxe services, meant to ensure comfort during journey, cost considerably more than the ordinary services in all the cities. However, the de luxe services are the least expensive in Bombay upto a distance of 2 kms., and are the most expensive in Delhi upto a distance of 8 kms. These services become more expensive in Calcutta and Bombay for distances exceeding 8 kms., and are the cheapest in Delhi for distances exceeding 15 kms. It follows that the de luxe bus service is biased in favour of short distance commuters in Bombay, and of long distance commuters in Delhi. On the whole, Calcutta is the most demanding on those who commute by de luxe buses.

(iv) The minimum fare charged in an ordinary bus varies from 30 p. in Delhi, 40 p. in Madras and Calcutta, to 50 p. in Bombay. However, a 40 p. ticket permits a commuter to travel upto 16 kms. in Delhi, almost 7 kms. in Calcutta, and only 2 kms. in Madras.

(v) The fare structures of Delhi and Calcutta maintain large distance slabs, and that of Bombay and Madras relatively short distance ones. In other words, the number of distance slabs is smaller in the former two cities and larger in the latter two. The factor of convenience in managing big crowds in Calcutta and Delhi seems to have weighed heavily with the concerned authorities.

Cost Revenue Equation

That public bus service organisations in all the super-metropolitan cities are running at a varying degree of loss can easily be inferred from Table 9 and Fig.4. The cost per effective kilometre is the highest (755 p.) in Calcutta but the corresponding revenue is only next to the lowest (357 p.). Bombay records the highest revenue (501 p.) but its cost is also relatively high (598 p.). Delhi shows the lowest revenue figure (235 p.). The cost is the lowest (438 p.) in Madras while revenue is relatively high (380 p.)

Table 9: Cost and Revenue Per Effective Kilometre of Public Bus Service in Four Super-Metropolitan Cities

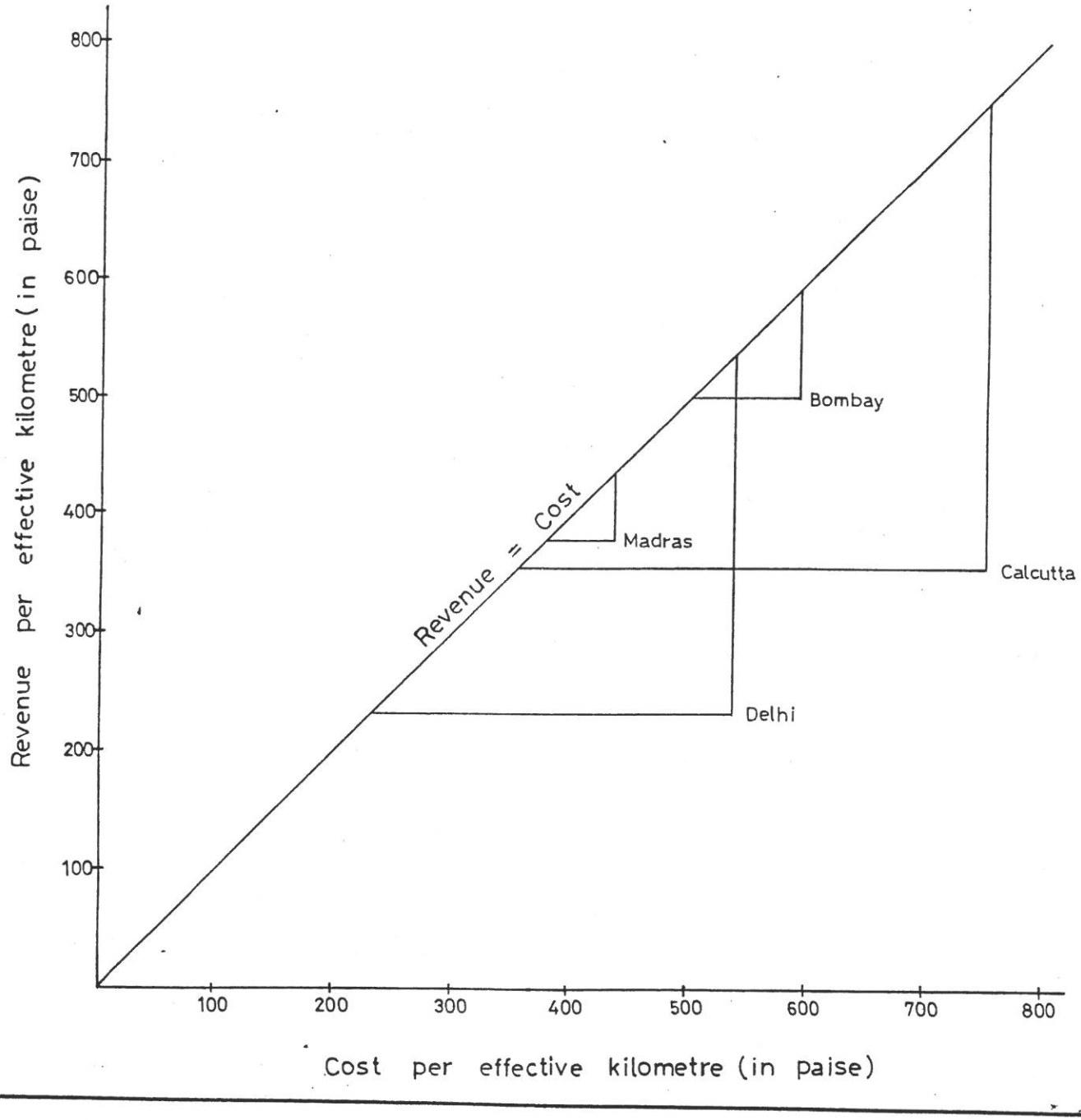
Name of the city	Year	Cost (in paise per effective km.)	Revenue *	Ratio between the cost and revenue
Calcutta	1981-82	755	357	100 : 47
Bombay	1982-83	598	501	100 : 84
Delhi	1982-83	537	235	100 : 44
Madras	1982-83	438	380	100 : 87

Source: Central Institute of Road Transport (1984) : Performance Statistics of State Transport Undertakings 1981-82 and 1982-83, Pune.

* Effective kilometres represent the actual distance operated by the public service vehicles for the purpose of earning revenue. See Central Institute of Road Transport (1978): Compendium of Transport Terms, p.3.

Fig. 4

COST AND REVENUE PER EFFECTIVE KILOMETRE IN FOUR SUPER-METROPOLITAN CITIES : 1982-83



Thus, the performance of Madras is the most creditable. Its revenue effort is as much 87 per cent of its cost liability. Bombay is in an equally comfortable position. It is meeting 84 per cent of its expenditure through the revenue earned.

By contrast, the performance of Delhi is the weakest on this count. Its revenue accounts for hardly 44 per cent of its cost. Calcutta is in no better position. Revenue makes up for only 47 per cent of the cost. The highly subsidized bus systems in the two cities account for this sort of affairs.

By all counts, there is a need for rationalising the fare structure of Delhi's public bus system. It is being subsidised beyond a desirable limit. With a regular rise in the cost of its operations, and the fare rates remaining fixed over the years, the quantum of loss suffered by the Delhi Transport Corporation is increasng every year. Any scheme for improvement in quality of service will entail additional expenditure. There does not seem to be any escape from raising the fare rates under such circumstances. A review of earlier rationalisations may throw some light on the mechanism and underlying considerations of such efforts.

Delhi Bus Fare Rationalisations : 1969-85

At the time of its formation on November 3, 1971, the Delhi transport Corporation inherited a fare structure which had earlier been rationalised on May 1, 1969. The 1969 fare structure had as many as 17 distance slabs (Table 10). The minimum fare was 10 p. for a distance of 2.5 kms. and 15 p. for 4 kms. The maximum fare was 65 p. for a distance of 36 kms.

The Delhi Transport Corporation rationalised the fare structure for the first time on October 22, 1975. The most striking change was the phenomenal reduction in the number of distance slabs from 17 to 2. Tickets of only two denominations, that of 30 p. for journeys upto 16 kms. and of 60 p. for journeys covering longer distances, were adopted. It was a gross simplification of the fare structure, both for the supplier and the consumer of the public bus service.

Table 10: Fare Structure Rationalisations by Delhi Transport Corporation, 1969-85

Date of rationalisation	Minimum fare (for 4 kms)	Maximum fare (for 36 kms)	Number of distance slabs	Consumer price index (Base 1960=100)	Fare index Minimum (Base 1.5.69=100)	Fare index Maximum (Base 1.5.69=100)
1.5.69	15*	65	17	165	100	100
22.10.75	30	60	2	279	118	55
14.4.78**	25	100	4	304	90	84
11.02.79	30	80	5	321	103	63
22.02.79	30	75	5	321	103	59
January,1985	30***	75***	5	538	61	35

Source: Delhi Transport Corporation, New Delhi for fares, and Central Statistical Organisation, New Delhi for consumer price index values for urban non-manual employees.

* For distances upto 2.5 kms., the charge was 10 p.

** The 14.4.78 fare structure was approved by the Government but not introduced.

*** The same as on 22.2.79.
On 14.4.1978, the fare structure was again rationalised and got approved by the government. However, it was not introduced,

perhaps for fear of public resentment.

Another rationalisation came on February 11, 1979, which was soon followed by still another modification on February 22, 1979. A minimum fare of 30 p. was kept for distances upto 4 kms. The maximum fare was fixed at 75 p. for distances beyond 20 kms. The number of distance slabs was increased to 5.

Two facts clearly emerge from the above discussion. Firstly, the successive rationalisations worked toward a manageable number of distance slabs. Too large a number was found as unwieldy, and too small just indiscriminating. Four or five distance slabs were reckoned as desirable and convenient. Secondly, the fares were kept at low levels, in all probability under public pressure and political considerations. No concious effort was made to adjust them to the prevailing price index. The index for the minimum fare declined from 100 in 1969 to 61 in 1985. The corresponding fall in the index for the maximum fare was from 100 to 35. Thus, in real terms, the commuter is now paying only one-third to three-fifths of what he was paying in 1969. The bus service has become distinctly cheaper over time. The long distance commuters have been the greater beneficiary in this process.

The task of future rationalisation is, however, not easy in any case. On the one hand, a proper assessment has to be made of its impact on the (i) commuters as belonging to the different income groups, (ii) changes in the modal split of vehicles plying on the roads, and (iii) land use map of the city. One the other hand, an appropriate alternate fare structure has to be designed, which must

answer questions relating to the minimum charge, the number and size of the distance slabs, and the amount of fare in each case.

In a paper presented at the National Seminar on Metropolitan Transport in India held recently at New Delhi, Balasubramanian (1985) indicated that a local cess on popular consumer goods, such as cigarettes, alcohol and petrol, could be adopted as a substitute to any raise in the bus fares. In 1974-75, some urban transport undertakings in India received a part of the additional cess on petrol imposed by the Central Government as special central assistance. In Bombay, the losses suffered by the B.E.S.T. on metropolitan transort are more than made up for by the profit on electricity charges (Kundu and Venkatakrishnan, 1985).

Other alternatives to the fare rationalisation have been listed as regular financial assistance from the State and the Central governments, and special assistance from the international financial institutions like the World Bank. In the former case, the metropolitan transport will take a larger chunk from the resources available with the State and the Central governments. This amounts to subsidising the metropolitan transport at the cost of other sectors. The latter case of special assistance from the international institutions could be deemed simply as an ad hoc measure to overcome some special difficulty. This could not be relied upon as an assured source of regular finances.

CONCLUSIONS

The main findings of the study and their policy implications may be stated as follows:

(i) The bus fares are the lowest in Delhi, followed by those in Calcutta, Madras and Bombay in that order. In fact, the Delhi commuter enjoys double benefit. Firstly, he pays the lowest fare for practically any comparable distance. Secondly, his commuting costs increase at a lower rate for longer journeys. Also the Delhi bus service has become cheaper over time. In real terms, the Delhi commuter is paying only about one-third to three-fifths of what he was paying around the time of establishment of the Delhi Transport Corporation in 1971.

(ii) For obvious reasons, the Delhi Transport Corporation suffers heavy losses in its efforts to maintain a highly subsidised fare structure. Part of the losses is attributed to concessional fares permitted to certain groups like the student communitiy, residents of the resettlement colonies, and handicapped persons. This calls for a social accounting of the system as an adjunct to its economic accounting. At present, the Corporation is recovering only about 40 per cent of its total expenditure.

(iii) There is evidently a need for rationalising the bus fare structure of Delhi. This has become althemore compelling in the wake of recent rationalisations carried out by Madras

and Bombay, whose economic performance was distinctly less inefficient than that of Delhi. However, before the manner and magnitude of rationalisation is finalised for Delhi, its impact on household economy, transport modal split, pollution level and housing problem must be assessed.

(iv) Could fare rationalisation be substituted or complemented by other measures? Can Delhi Transport Corporation be allowed to maintain its fare structure and get compensated for its losses through local cess on items like electricity, petrol and liquor? Does the Delhi commuter deserve any preferential treatment by reason of his almost total dependence on bus service? Such issues deserve critical examination.

(v) It is also imperative that the use of the local rail service is promoted. Toward that end, is it possible to render a parity between the local bus and rail fare, and to have a common-pass system for commuting by local bus or rail? This indeed demands a high degree of management coordination between these two services.

References

1. Association of State Road Transport Undertakings:

Working Paper No.23,
New Delhi.

2. Balasubramanian, K.M. (1985):

"Financing and pricing of metropolitan road transport systems",
Paper presented at the National Seminar on Metropolitan Road Transport in India, March 1 and 2, 1985,
New Delhi.

3. Census of India (1981):

Primary Census Abstract General Population, Part II B(i),
New Delhi.

4. Central Institute of Road Transport (1984):

Performance Statistics of State Transport Undertakings,
1981-82 and 1982-83,
Pune.

5. Delhi Development Authority (1982):

Seminar on Transportation, Delhi 2001,
New Delhi.

6. Kundu, Amitabh and Venkatakrishnan, P.V. (1985):

"Performance of metropolitan transport in India - some issues",
Paper presented at the National Seminar on Metropolitan Road Transport in India, March 1 and 2, 1985,
New Delhi.

7. Maunder, D.A.C., et al (1981):

Characteristics of Public Transport Demand in Indian Cities,
Transport and Road Research Laboratary, Berkshire.

8. Pandiyan, M.S.S. (1985):

"Bus fare hike and World Bank",

Economic and Political Weekly, Vol XX, No.14, p.582.

9. Sampson, Roy J. and Farris, Martin T. (1979):

Domestic Transportation,

Houghton Miffin Company, Boston.

10. World Bank (1975):

Urban Transport Sector Policy Paper,

Washington.

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Fig. 4

COST AND REVENUE PER EFFECTIVE KILOMETRE IN FOUR SUPER-METROPOLITAN CITIES : 1982-83

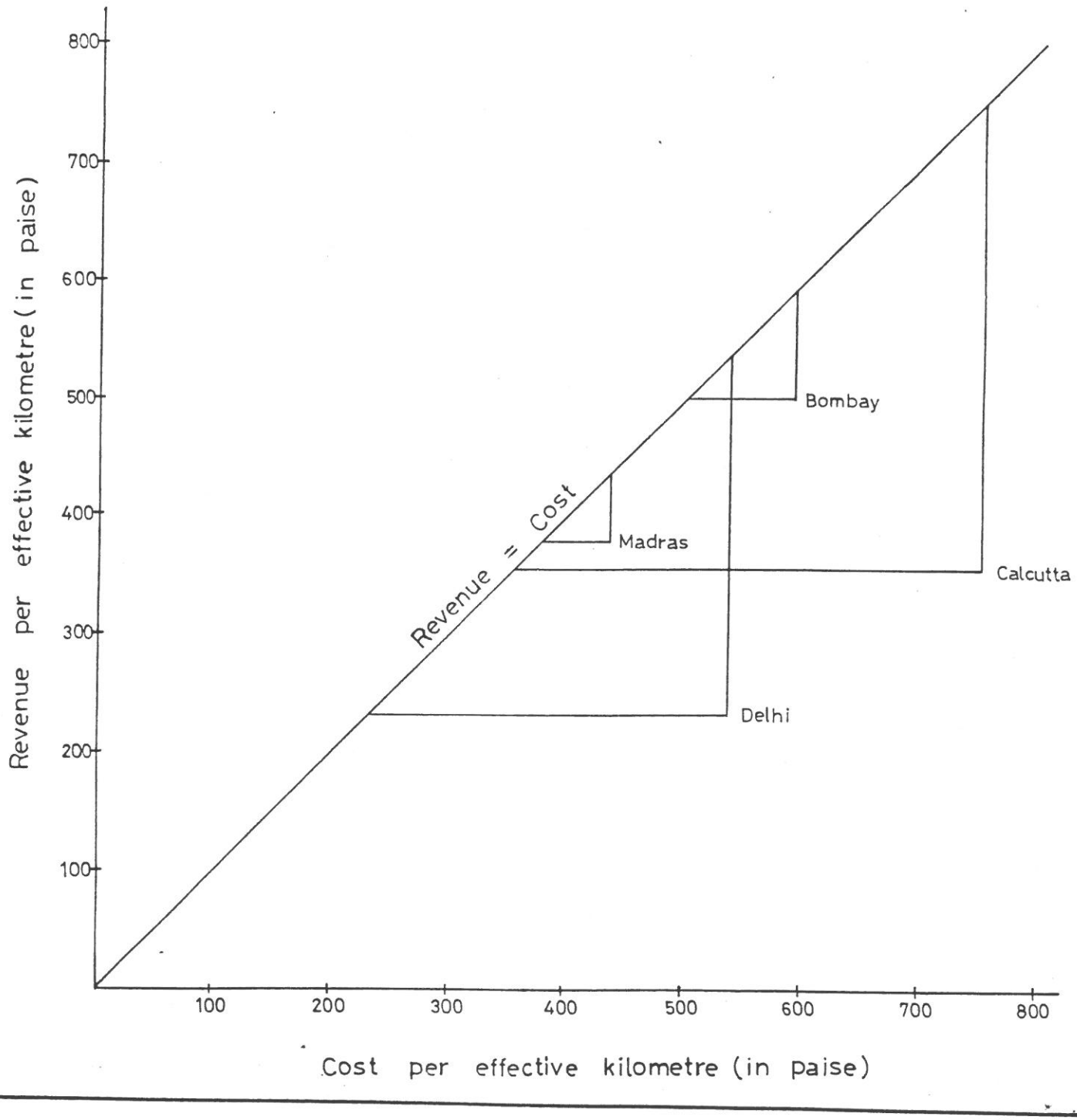

Fig. 3

VARIATIONS IN ORDINARY BUS FARE WITH DISTANCE IN FOUR SUPER-METROPOLITAN CITIES 1985