

# Ownership and Efficiency in Urban Buses

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OWNERSHIP AND EFFICIENCY IN URBAN BUSES

Efficiency in urban bus operation depends on, among other things, the institutional form of the bus business. For certain cities in LDCs where there are parallel private and publicly owned operations, it is demonstrated that the costs of private provision are between 50 percent to 60 percent of those of publicly owned concerns. Additional evidence is adduced to show that the quality of private bus services is not markedly inferior and usually superior to the public bus operation.

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## OWNERSHIP AND EFFICIENCY IN URBAN BUSES

### I. INTRODUCTION

One of the characteristic features of urban bus services is creeping, if not galloping, municipalization or nationalization. The rationalizations for public ownership vary in detail but all have a common theme: the need to integrate and coordinate services and avoid the wastes of competition. This objective does not require public ownership; suitably regulated private bus companies could perform in a similar way to those of a nationalized concern. But public ownership is thought to make it easier to implement plans for coordination--and in particular to insure that certain unprofitable but "socially necessary" services are provided. Claims that nationalization would reduce costs are the corollary of the elimination of alleged wasteful competition. Route "rationalization" and the introduction of efficient large fleet maintenance procedures are meant to produce significant reductions in cost for the publicly owned concern.

So far as we are aware, there have been no scholarly evaluations of the extent to which nationalization has achieved the aims of integration, coordination and rationalization. This may well be because the concepts are difficult to define in any meaningful sense. With costs it is another matter. It is incumbent on analysts of public transport to investigate the costs of transport and how such costs vary with respect to the institutional form. The main purpose of this paper is to compare the costs of services of privately owned buses with costs of the nationalized companies. The associated issue, the range of size of firm over which there are economies or diseconomies of scale, is not tackled. If there are economies of scale, above the 300 to 400 bus concern, then these should operate in favor of the nationalized corporation--and if there are diseconomies, then the contention of the "nationalizers" or "integrators" is discredited. Nor do we attempt rigorously to identify the sources of the differences in cost of the public and private sectors--although some general explanation of the differences observed in, for example, wage costs are tentatively suggested.

One main drawback of this study is the limitation of the sample. We have examined the data of three cities in LDCs and more casually two in developed countries where there are similar bus operations in the private and public sectors. The cities tended to choose themselves since there are few examples where public buses and substantial numbers of private buses operate under similar conditions with similar routes and in the same factor markets. This selectivity is important because it might be suggested that the existence of a large number of privately owned buses testifies to the failure of nationalization. 1/ Thus it may be alleged that we have selected

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1/ The opposite charge that the private sector has ruined the nationalized corporation cannot be substantiated in our cities. The nationalized corporation had the authority to grow; what it lacked were financial, operational, and administrative means. The private sector has been tolerated, not encouraged, because of the failure of the public sector.

only hopeless situations. We shall bring evidence to suggest that this is not the case; but the issue can be satisfactorily settled only by the accumulation of more evidence than we are able to present here.

## II. DATA ON COSTS

Evidence on relative costs comes in two basic forms. First, there are the results of cost investigations or inquiries by experts. In some cases this takes the form of examining accounts, but in most cases the records are insufficiently illuminating and the experts usually substitute vigorous inquiries directed at operators and direct observation reinforced by their experience and general knowledge. What emerges is a comparison of unit costs. The second form is to infer the relative costs from one usually well-known fact: the amount of money needed to cover the deficit of the municipalized or nationalized bus company, and from one axiom, namely, that if private operators persist in offering their services, they will be making at least normal profits. For example, suppose there is a publicly owned bus company which covers half its cost by a subsidy and that in the same city private operators run virtually identical services at the same fare, then provisionally it may be concluded that the costs of the public operation are twice those of the private operator.

Of the two forms of evidence, the latter is preferred. The subsidy is normally a matter of public record and is open for all to see. Similarly, the level of fares is not a difficult matter to observe and cannot easily be obfuscated. Conditions of the service are also issues upon which the outsider can make judgments. On the other hand, the cost evidence is more subjective and open to varied interpretations. Many investigators have substantial experience only in the public sector and they quite naturally are apt to apply the standards which they think are appropriate, especially with respect to maintenance, depreciation and amortization, and perhaps also labor costs. It is not unusual to find that such experts suggest that the private operators cannot conceivably be covering their true costs and that they are incipient bankrupts busily eating their seed corn. <sup>1/</sup> It is also troublesome to have to estimate what are "normal profits" as a constituent of cost.

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<sup>1/</sup> The classic statement of this position with respect to the trucker but equally applicable to bus operators, repeated many times in the literature, is the Salter Report of 1933.

"(the trucker) is able to purchase his vehicle on the installment system and is often tempted to force his way in by offering rates which are completely unremunerative and which necessarily lead to bankruptcy which, nevertheless, does not discourage others--or perhaps even himself--from following the same course in perpetual succession...."

This strange description was found to be quite inconsistent with the facts--indeed unregulated truckers had lower bankruptcy rates than virtually all other industries in the period 1920-1933. See W. McLeod and A.A. Walters "A Note on Bankruptcy Rates in Road Haulage Industry," Journal of Industrial Economics, 1956.

Another generic problem with these comparisons is that the extent of regulation, both overt and covert, and political direction varies considerably and sometimes to an extent unknown. Private operators, although they may be ostensibly legally free to pursue their own policies, often have the threat of nationalization held over their heads in order to get them to conform to what is thought to be in the interests of the political regime then in power. We have tried to elicit the nature and extent of this political or bureaucratic control, but there is no doubt much that we have not uncovered. 1/

#### A. Subsidies and Fares

Comparison of costs of a publicly owned bus company and those of private concerns can be useful only when the two are operating in virtually the same environment under the same conditions. Calcutta, Istanbul and Bangkok were three LDC cities in which we could identify such parallel public companies and private operators. Each city has a publicly owned bus company operating parallel with privately owned buses. One is naturally cautious about drawing conclusions from a self-selecting sample of this kind. Is it not true, for example, that the very fact that private operators are tolerated attests to the failure of these public companies? In other cities it may be suggested that public competition has been a "success" and we have simply picked out the basket cases. Perhaps so, but there is much circumstantial evidence against this argument. In many low-income countries public bus companies have large and increasing deficits. 2/ Furthermore, a study of OECD countries in 1975 showed that subsidies were ubiquitous ranging from 11% to 70% of operating cost (i.e., excluding large capital costs) with an average of 37%. 3/

In Calcutta, Istanbul, and Bangkok the public bus companies cover about 60%, 37%, and 72% of their total costs with their revenue. For the three cities we have the following data on deficits (excluding interest on accrued deficits):

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1/ In an earlier study, Lim (1978) looked at the effect of ownership (public or private), competition (strong or weak direct competition between buses and other modes), and fleet size on cost efficiency for nine Asian cities. Only the form of ownership had anywhere near a statistically significant effect on cost. A test of the average cost per bus seat mile, adjusted to reflect relative prices and cost of living, showed private bus costs to be lower than public bus costs. Lim's results are contrary to conventional wisdom.

2/ Idem. Besides Bangkok, Calcutta and Istanbul, these include Bombay, Madras, Jakarta, Manila, Karachi and Cairo.

3/ OECD (1979).

		<u>Deficit (\$)</u>	<u>Total Revenue/Total Cost (%)</u>
Calcutta	1976	8 million	0.60
Istanbul	1977	35 million	0.37
Bangkok <u>/a</u>	1978	17.6 million	0.72

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/a Part of the interest on accrued deficit could not be eliminated from the costs.

Calcutta deficits began in 1962/63 and have increased every year (doubling between 1972 and 1977). Istanbul's deficit has increased fourfold since 1973, the first year for which data are available. In Bangkok the public operator has had a deficit since 1976 when the nationalized company was formed and the deficit is expected to increase substantially.

But in each of these three cities private operators also ply, with the same fare, carrying a substantial proportion of bus ridership (75% in Calcutta and 60% in Istanbul, and an uncertain 40-50% in Bangkok) and they earn a profit at least sufficient to induce them to stay in business. They also pay taxes. The most rapid growth in private operators' share of the total bus fleet and ridership in Calcutta and Istanbul has occurred after some years of public ownership. These data do not discredit the tentative hypothesis that private operators provide similar bus services at lower cost. The differences can be impressive. In Istanbul, with the same fares, a minibus owner makes about LT 20,000 (US\$1,100) profit per year per bus and the public operator loses LT 1.15 million (US\$64,000) per year per effective bus (see Annex 3). 1/

The use of these data on subsidies to adduce the relative costs of private and public bus operations involves the assumption that the private operators are making only normal profits. Since there is, in all cities, a persistent pressure on the authorities (or others) by incipient private operators for licenses (or other "authorization") to run a bus, one may suspect that profits were probably above normal. Thus the ratio of revenue to cost in the publicly owned enterprise is an underestimate of the ratio of the costs of the private firms to the costs of the publicly owned concern. We conclude therefore that the ratio of private costs to public costs is likely to be lower than the range 0.37 to 0.72 observed in the sample cities. These are, of course, indirect estimates and need to be checked against the material from studies of cost.

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1/ In high income countries, a study of Australian public transport (Wallis, p. 9) states: "for a typical suburban route now run by a public operator and subsidized at the 60% level, transfer to a private operator might be expected to reduce the subsidy required by some two-thirds, assuming no change in fare level."

## B. Cost Comparisons

We now examine what evidence is available on the costs of the private and publicly owned concerns in the cities.

Calcutta: Prior to 1966, Calcutta State Transport Corporation (CSTC) had a monopoly of service within the corporate limits. Through an inability to meet the growth in demand, CSTC lost its monopoly (Thomas, 1977). By 1978 Calcutta was served by approximately 940 publicly owned CSTC buses, 1,500 private (usually owner operated) buses, and a large fleet of smaller para-transit vehicles which will not be considered here. Some characteristics of the private and public bus services are delineated in Annex 1.

According to figures quoted by private operators to a Government of India Taxation Enquiry Board, the cost of operation in 1978 was about Rs 3.35 per km or Rs .096 per seat-km. Considering the forum, it is possible that this figure is an overestimate. Based upon CSTC accounts, public buses in 1978 cost about Rs 6.32 per km or Rs .113 per seat-km.

Since buses in Calcutta are almost always full--often more than three times as many passengers as seats during peak periods--cost as a function of capacity (seated and standing) better reflects vehicle utilization and is more meaningful. Based upon gross capacity, private buses are even less expensive relatively with a cost of Rs .051 per capacity-km for private buses and Rs 0.78 per capacity-km for public ones. These figures show private buses to cost 53% of public bus costs on a km basis, 85% on a seat-km basis and 65% on a capacity-km basis. 1/

Bangkok is served by some 4,000 publicly owned Bangkok Mass Transit Authority (BMTA) buses, about 10,000 private buses and minibuses and a large number of smaller private public transport vehicles. Reliable financial statistics are unavailable for public and private operators. Therefore, in this case, one can only look at the "bottom line." BMTA was created in 1976 through the consolidation of 22 private and 2 public companies. Though some of these companies were profitable, in 1978 BMTA covered only 70% of its costs (not including interest on accumulated debt). Annex 2 gives further details on transport in Bangkok.

In FY77-78 BMTA lost Baht 350 million (US\$17 million), and in 1979-80 it would have been Baht 950 (US\$47 million) provided that there is no more than 10% reduction in its passenger rate. The BMTA can break even by doubling the fare to Baht 2 (US\$0.10). In July 1979 it was decided to raise the fare to Baht 1.5 but even so it is expected to continue to require a subsidy of about Baht 500 million (US\$25 million) in 1979-80.

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1/ Evidence to counter the argument of selectivity bias may be adduced by comparing the cost of private bus operation in Calcutta with the public operators in Bombay (BEST) which is considered to be the most efficient public company in India (Commerce). Even so, the private operators' cost is lower per km.

Istanbul is served by approximately 750 publicly owned Istanbul Electric Tramways and Tunnel (IETT) buses, about 3,500 privately owned (one half owner operated) minibuses and midibuses, and a very large fleet of dolmus (exclusive and shared-ride taxis) and 100 IETT trolley buses which will not be considered here. Some characteristics of the public bus and private minibus services are presented in Annex 3.

In 1977 the cost of operation for an IETT bus was about LT 20-23 effective km or LT 0.5-0.55 per seat-km. In the same year minibuses cost LT 2.7 per km or LT 0.27 per seat-km. Minibuses, even on a seat-km basis, cost under half as much to operate, and provided service to almost twice as many passengers as the stage bus without subsidy.

Australia. In 1975 Australian cities with over 10,000 population had 9,120 buses, of which 4,168 (46%) were owned by private companies. A study of average costs for a sample of public and private operations in 1972-73 gave the result presented in Table 2.1.

Table 2.1: AVERAGE COSTS FOR VARIOUS BUS OPERATORS IN  
AUSTRALIA, 1972-1973  
(Wallis, 1979)

Operator	Operating Costs (\$'000 p.a.)	Bus Km p.a. (million)	(Average Cost)	
			£/km	% of MTT Hobart
MMTB Melbourne (G1)	6,394	11.9	53.7	104
MTT Hobart (G2)	3,184	6.2	51.4	100
MTT Adelaide (G3)	8,270	17.5	47.3	92
MTT Perth (G4)	13,777	37.7	36.5	71
Brisbane CC (G6)	12,048	20.1	60.2	117
Victorian private (P1)	13,754	45.9	30.0	58
Various private (P2)	4,899	17.3	28.3	55

The far right column shows the unit cost of the bus system as a proportion of the figure for MTT in Hobart (a fairly typical public operator in terms of its average cost). On average, unit private bus costs were estimated to be between 50% and 65% of those of the typical public operator. 1/

New York Metropolitan Area: In 1974-75 a study estimated the average cost of public bus operation to be about 11% to 15% higher per hour than private bus operation. The weighted average private bus costs per vehicle-hour in 1974 and 1975 were \$19.76 and \$21.40. For the public operator the costs per vehicle hour were \$22.14 and \$23.82 respectively. 2/ The relatively small difference in cost may be a result of the stringent regulation of private operators and the extensive unionization in the New York area. In this study average cost rose with size of the firm. The two largest operators with 2,400 and 1,400 buses respectively had a mean cost of \$24.40 per vehicle hour. Nine smaller bus firms with a maximum of 310 buses had an average aggregate cost of \$18.05. This is an interesting observation because public operators tend to be large and private bus firms tend to be small with the owner-operator common in low-income countries.

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1/ The study countered the charge that a simplified comparison of average cost per km would not account for different operators running different services in different operating conditions as follows: "However, the results quoted here are a summary of more complex analyses in which, wherever possible, costs of the various operators were subdivided into several components and in particular into components which would be expected to vary with the hours operated, the distance run and the number of buses in the fleet (by the method described in Travers Morgan 1978). Unit costs for each component were then used to synthesize the costs for various operators to run a typical public bus operation (actually MTT Hobart). The relative costs obtained were very similar to those already presented. Other analyses on this subject (Gilmour 1974) reached the same conclusion when using similar methods to compare the Melbourne public and private bus operations.

Thus it is safe to conclude that, on average, the unit costs for private operators in Australian urban areas are only between one-half and two-thirds of those of public operators in providing a similar service." (Wallis, 1979, p. 4).

2/ These figures are based on data in Annex 4.

Table 2.2 brings together the summary results for the five cities. Because of the rough nature of operating cost data and the limited scope for interpretation, the cost comparisons should be taken as a tentative corroboration of the implications of the data on subsidies. It seems that private operators with a substantial subsidy can provide about the same service as public operators. 1/

Table 2.2: SUMMARY OF COST COMPARISONS

	Private (1)	Public (2)	Ratio (1) (2)
<u>Calcutta</u>			
	<u>Bus</u> (Rs)	<u>Bus</u> (Rs)	
per km	3.35	6.32	0.53
seat km	.096	.113	0.85
capacity km	.051	.078	0.65
<u>Istanbul</u>			
	<u>Minibus</u> (LT)	<u>Bus</u> (LT)	
per km	2.74	20-23	0.13
seat km	.27	.5-.55	0.51
<u>Australia</u>			
	<u>Bus</u> (\$)	<u>Bus</u> (\$)	
per km	0.27	0.27	0.58
<u>New York City--Metro. Area</u>			
	<u>Bus</u> (\$)	<u>Bus</u> (\$)	
per vehicle hour	21.40	23.82	0.90
Bangkok <u>/a</u>	-	-	0.70 (max.)

/a Based on implied costs, not on cost study.

1/ It does not follow that private operators are always and everywhere less costly than public operators. One study, Fouracre and Maunder (1979), shows that in Surabaya (Indonesia) the public operator of large buses had seat mile costs which were only 50% of those of the minibus operators. This appears to be a neat reversal of the general rule found in other cities where the cost evidence has been broadly consistent with the figures for Surabaya. Our credibility is stretched, however, by the fact that private minibuses are flourishing and earning profits. Thus, if the average minibus profit on turnover were only 1% and if the load factor of buses and minibuses were the same, the public bus corporation would earn more than 50% profit on turnover, and probably 200% to 300% on capital. Jacobs Fouracre and Maunder (1979) report that profits of buses (1976) were only 27% of turnover which suggests that the load factor of minibuses is much higher than buses.

Questions concerning the quality of the service are tackled next.

C. Private Operators--Exploitation and Quality

Table 2.3 lists most of the many charges made against private bus operations. The four main criticisms are that private operators exploit labor, have poor financial practices, contribute to traffic anarchy, and that levels of service deteriorate. The evidence is now examined.

One concern shared by many observers from high income countries is that private operators pay low wages for long hours. In all cases we have examined, employees of the private companies were paid lower wages with fewer benefits than their counterparts in the public sector. However, private bus employees seemed to be earning normal or above normal wages. In Istanbul and Calcutta private bus workers earn more than the average income for bus riders. 1/ Because of the greater flexibility of labor contracts in the private sector (e.g., the driver doing simple maintenance and repairs, and employment of part time-workers), the wage cost per bus hour are likely to be much lower than the wage costs in the public sector. Wage costs of the private sector are not inflated by the absenteeism characteristic of public operators. And by maintaining market wage rates and non-restrictive labor practices the private operators maintain appropriate capital-labor ratios and insure that there is no inefficient substitution of capital for labor.

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1/ In Istanbul drivers earn about LT 50,000/year and in 1973, 90% of all households earned less than that (Sanli 1977). In Calcutta drivers earn about Rs 1,000/month and conductors Rs 500/month. The average income of bus riders in the same year was Rs 547/month (Thomas 1977). Even the "lowly" caller in Calcutta earned Rs 75/month which is about the Rs 100/month earnings of a slum household in Calcutta (Commerce 1978). In some cities private bus and minibus employees receive pensions and other benefits (Buenos Aires, for example) and the operators remain competitive.

Table 2.3: CRITICISMS OF PRIVATE OPERATORS

Job Environment

- No benefits or pension
- No job security
- Long hours
- Low wage
- Child labor

Financial Concerns

- Owners do not account for amortization
- Default on loans
- Buy vehicles and spare parts on black market
- Support loan sharking/protection rackets/gangsterism
- Lack insurance

Service Concerns

- Cause congestion (re: inefficient use of road space)
- Contribute to traffic anarchy (re: poor driving habits)
- Stopping in street to load/unload
- Lack inspection
- Cruising (waste fuel)
- Overcrowding
- Cause and have more accidents
- Overcharge in peak and evening hours
- Vanish in rain and when in low demand
- Fear of cartelization
- Creaming of riders

It is often alleged that private bus operators make inadequate financial and insurance provisions and live from hand to mouth (or from fare box to gas tank), thus skimping on depreciation and maintenance of their vehicle. In some cases (Bangkok, and the early days of the minibus in Hong Kong), it is suggested that, through the operation of the loan shark and protection rackets, they fall into the hands of gangsters and racketeers.

It is difficult to test all these assertions. But some clearly are not generally true. In Calcutta and Istanbul, private firms have much better maintained buses than the publicly owned concerns (Commerce 1979, Thomas 1977). Observers in Bangkok claim that private minibuses often overload and are unsafe--but it is not clear that on the average they are worse maintained than the public buses. One would expect that the standard of maintenance and safety of passengers in the private sector would respond to passenger demand. The clientele gets as much safety as it wants at the going price. It would be patronizing to impose higher or even Western standards (and

costs) of road safety on people whose priorities lie elsewhere. <sup>1/</sup> One might expect owner-operators to drive more carefully to protect their investment and generally to take better care of their vehicles than would hired drivers. Huddard, in an unpublished study of accidents in Mombasa, where common wisdom is to attribute the majority of accidents to the minibuses (mutatus), found no significant increase in accident rates between 1972 when there were no mutatus and 1977/78 when 1,270 mutatus were in operation. Sanli, discussing Istanbul, suggests that differential financial constraints (high interest rates, high taxes, etc.) on private bus operations contribute to overloading, poor driving habits, and too long hours. But there seems to be no concrete evidence to support the allegation of "higher accident rates." The charge is unproven.

The most common fault attributed to private bus operators, particularly in low-income countries, is that they contribute to congestion. Such allegations need to be put in perspective. For example, in Bangkok there are about 12,000 paratransit vehicles in operation and over 220,000 private cars, with the former running near full occupancy during peak periods and with the latter rarely being occupied by more than two people. The culprit is the car, not the bus.

In any case, in order to reduce congestion, traffic rule enforcement, priority lanes for buses and private minibuses, separate and distinct minibus stops, and a host of traffic management techniques for all traffic can be used to improve traffic flow. And the private sector has contributed some ingenious systems of its own. To maintain orderly and evenly spaced running, in Calcutta a private bus driver must pay a fine to the driver behind him if he runs late (Roth 1979).

The most persistent charge against private operators is that they serve only profitable routes and that where they ply levels of service deteriorate. In Calcutta and Istanbul, however, the public operators have first choice of routes. There is some evidence that they choose the most desirable profitable routes and leave the less desirable routes to the private operators. In Calcutta, the private operators are also generally restricted to areas outside the city center with much poorer road conditions. In Bangkok, the minibuses serve the sois (usually narrow and sometimes unpaved side roads) where buses cannot ply. In Istanbul, minibuses have served profitably routes dropped by IETT. Sanli, p. 6, observed that "it is also the dolmus and especially the minibus system which provides transport service to the squatter areas (settlements declared illegal by the municipality) where substantial new growth takes place but provision of essential service, including municipal bus transport, has been withheld." This evidence seems to counter the charges that private operators only serve the "best" or most profitable routes.

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<sup>1/</sup> There is, of course, the issue of third party costs of accidents, but this is general to all vehicles and is not particular to private bus operators.

Another charge is that the private bus operators take only the "cream" of the traffic peak. But such "creaming" may benefit publicly owned bus operators because it reduces resource requirements for the peak. It has been estimated, for example, that the public bus concern in Bangkok would need 40% more buses to serve the peak and this would increase its deficit substantially. The "cream" is apparently not always good for the health of the nationalized firm.

Other arguments suggesting levels of service deteriorate when private operators ply have been discredited by empirical evidence. In Calcutta private buses were more evenly spaced, marginally more comfortable and less subject to breakdown, and have "better general appearance and performance" (Thomas 1977, p. 19) than publicly owned buses. In Istanbul (SAMAD (1979)) and in Chiangmai (Fouracre (1977)) and most other cities where they operate minibuses had faster operating speeds than the public buses. Since private operators often find it profitable to use minibuses, levels of service improve through increased frequencies of public transport services.

Thus, it appears many of the problems described in Table 2.3 are figments of the imagination. Some involve impositions of Western standards on LDCs and some have much cheaper alternative solutions.

### III. CONCLUSION

Where public and private operators both ply at the same fare, private operators provide equivalent if not better services at no subsidy (or two-thirds less in the case of Australia) and public operators require massive subsidy support. Private operators generally appear to be 50-65% less expensive than public buses and in addition they usually pay large sums of money into government treasuries. Obviously cost is only one side of the coin with level of service being the other. We have attempted to show how often the charges against private operators are not supported by the data and, even if they were, there are much more cost effective solutions than banning them. Because of restriction on fares, demand far exceeds supply in many cities, and if the private operators were quickly removed from the scene the public operators could carry the total traffic only with greatly increased subsidy. In addition, these private operators have cropped up locally, respond quickly and efficiently to the market, often provide a myriad of other services (such as works buses, goods movement, delivery services, etc.), use local expertise and materials rather than imported, and are very adaptable.

Finally one may reflect that the disparities between public and private ownership are so large there is a good prima facie case for opening up all nationalized bus monopolies to private operators of either buses or minibuses. The implications of such a policy are, however, far beyond the objectives of this paper.

PUBLIC AND PRIVATE BUS COSTS IN CALCUTTA

Calcutta is served by approximately 940 publicly owned CSTC buses, 1,500 private buses and a large fleet of minibuses, deluxe buses, taxis and rickshaws. Some characteristics of Calcutta's bus services are presented in Table 1. Only about 47% of the buses of the publicly owned bus fleet are effectively in operation on a given day. CSTC also suffers from undercapitalization leading to overaged vehicles (Thomas (1977)) and an effective trade union leading to very high manning and benefit levels (Thomas (1977)). CSTC has suffered from high absenteeism accounting for a 10% loss in effective bus kilometers, and high fare leakage of about 20% of revenues.

The 1,500 privately owned buses generally are owned by owner operators, who are members of route associations which set schedules and fines for late running. Fares are set at the same rate as public buses, and entry and routes are regulated by local authorities. Private buses do not often directly compete with public buses and tend to serve routes outside the central business district (Thomas (1977)).

Private and Public Bus Costs

In 1978 private operators reported their costs to be Rs 3.35 per km to a Government of India Taxation Inquiry Board. (Parker's estimate yearly cost Rs 231,000). If one accepts estimates of daily mileage of 200 km and uses a utilization of 90% or 330 days per year, this suggests a cost per km of Rs 3.5 (or 5% more than operator estimates) which is well within the errors of calculation of such figures. The cost per seat-km for the 35 passenger buses is .096 and per capacity (66 passengers) km is Rs .051 (Table 2.2)

According to their accounts CSTC buses cost Rs 184 million (Rs 505,342/day) in 1977/78 to operate. Based upon a total daily kilometerage of 80,000 the cost per bus-km is Rs 6.317. The bus fleet has an average seating capacity of 56 seats and therefore costs Rs .113 per seat km and has an average full capacity of 81 passengers costing Rs .078 per capacity km. The average capacity was based upon a fleet of 45% double-deckers with 72 seats and a capacity of 96; 3% articulated buses with 98 seats and a capacity of 130, and 52% single-deckers with 34 seats and a capacity of 66 passengers (Thomas (1977)).

A Consistency Test

CSTC covers about 60% of its total operating costs. Private operator costs are about 65% of public costs per capacity-km. Based upon this alone the private operators should be covering about 92% of these costs. However, fare leakage on public buses is estimated to be about 20% and for private buses has been estimated to be near zero because of family control and because wages for all crew members are based upon a percentage of daily revenues (Business India (1979)). If fare leakage is below 12%, private operators on an average would be making a profit; even with our rough private bus cost estimates.

PUBLIC AND PRIVATE BUS COSTS IN BANGKOK

The publicly owned BMTA was created in 1976 through the consolidation of 22 private and 2 public bus companies. Most of the private companies were profitable at the time of consolidation. Today, BMTA covers 70% of its costs. With most of its maintenance on private contract, BMTA had over 92% availability for its fleet with only a 3% breakdown rate in 1978.

Private minibuses began to expand rapidly in 1975. Guesstimates of their numbers are that about 6,000 were operating by 1977. Their numbers dropped when BMTA became fully operational and then rapidly increased to about 10,000 to 12,000 when it became apparent that BMTA could not meet the demand (Jamieson MacKay (1979)).

Minibuses operate on fixed routes, often on BMTA routes, with the route number marked on the vehicle. The flat fare of Baht 1 was the same as for BMTA buses up to July 1979, although it may be higher late at night and in certain sparsely populated areas where bus services are marginal. There are no effective controls on the number of vehicles in operation, routing, fares, times of operation, vehicle types and standards, or entry into the market.

Bangkok (1979)

	Private Minibus	Public Bus (BMTA)
Fleet size	≈ 10,000 minibuses/av. 21 seats = 210,000 seats	≈ 4,000 buses/av. 33 seats = 132,000 seats
Ridership	/a	/a
	1978 CORDON COUNT	→
	1% of vehicle trips	4% of vehicle trips
	8% of person trips	56% of person trips
	peak load factors ≈ 100%	peak load factor ≈ 150%
Fare	1 Baht -----same-----	1 Baht
Operational Characteristics	no effective regulation, direct competition w/BMTA	≈ 220 km/day
Staffing	two on Board	2-3 on board ≈ 5.5 employees/bus ≈ 6.0 employees/effective bus
Profitability	profit making	revenue covers 72% of cost 352 million Baht subsidy

/a The author has seen no actual estimates of ridership for BMTA and minis. This Cordon Count (as is often the case) must under-represent minibuses as more minis than big buses operate. Minibuses often are not on the main road.

PUBLIC AND PRIVATE BUS COSTS IN ISTANBUL

Istanbul is served by 750 publicly owned IETT buses, about 3,500 privately owned minibuses and midibuses, and a large fleet of Dolmus, taxis and trolleybuses. With its in-house maintenance, only about 60% (or 450) of the buses of its publicly owned bus fleet were effectively in operation on the average in 1978. IETT had high manning and wage levels, a severe revenue shortage due to concessional fares (20% of travel), fares fixed in money values and decreasing in real terms, and poor operating and maintenance conditions. In 1977 IETT had a deficit of LT 725 million (63% of total operating cost) or about LT 0.4 per bus-km.

The 3,300 privately owned minibuses operate at least 300 days per bus per year (over an 80% level of utilization) (Sanli (1977)). Fares are set at about the same level as public bus fares but are slightly higher for journeys of over 12 km. Fares, entry and routes are regulated by local authorities although illegal operations exist and are tolerated (Sanli (1977)). Minibuses do not directly compete with public buses since most of their routes serve areas outside the central business district.

The following data on costs were derived from the IETT Transport Department Operating Accounts for 1977.

	Yearly Bus Cost		
	<u>LT '000</u>	<u>LT per km /a</u>	<u>LT per Seat-Km /b</u>
Administration	147,218	3.9 - 3.55	.09 - .08
Depreciation and Interest /c	6,870	.186 - .166	.004 - .0039
Fuel/Oil	48,105	1.3 - 1.16	.03 - .028
Insurance	<u>/d</u>	<u>/d</u>	<u>/d</u>
Maintenance	296,799	8.05 - 7.15	.19 - .17
Payments to City	6,153	.167 - .148	.004 - .0035
Wages	<u>358,493</u>	<u>9.72 - 8.64</u>	<u>.23 - .21</u>
	863,638	23.4 - 20.8	.55 - .50

/a Range of estimates based on different estimates of total km run per year: 101,000 km/bus/day; 648,000 passengers/day and 4.7 passengers/bus/km (Sanli (1977)).

/b 42 seats per bus.

/c Note: The low value of depreciation is in part due to historical cost accounting in an inflationary economy and in part due to the high average age of the fleet. The latter fact is a part of the explanation of the high maintenance costs.

/d Not available.

The following minibus costs were derived from Sanli's study based upon interviews with 327 minibus drivers.

	Daily Minibus Costs (LT)	LT per 100 Km	LT per Seat per 100 Km <sup>/a</sup>
Management	<u>/c</u>	<u>/c</u>	<u>/c</u>
Depreciation and Interest <u>/b</u>	100	50.0	5.0
Maintenance	132	66.0	6.6
Tires	16	8.0	.8
Fuel	120	60.0	6.0
Wages	165	82.5	8.3
License	15	7.5	0.7
Insurance	<u>/c</u>	<u>/c</u>	<u>/c</u>
	548	274.0	27.4

/a 10 seats per minibus.

/b Depreciation based on average vehicle purchase price of LT 200,000, and LT 50,000 for a minibus license (Sanli) depreciated over 8 years at 10% interest. (Note that this is depreciation in current and not historical values.) Annual profit is also derived from Sanli's figures:

Net revenue:	LT 300/day for 300 days	LT <u>90,000</u>
- depreciation	LT 30,000	
- maintenance & tires	LT 34,150	
- license fees	LT <u>4,500</u>	<u>68,650</u>
		LT <u>21,350</u>

This is 12% of revenue and a rate of return of at least 20% on capital. (Sanli estimated the average profit of LT 35,000-55,000 per vehicle for paratransit generally in Istanbul.)

/c Not available.

#### A Consistency Test

IETT covers 37% of its cost. According to these estimates private operators provide seat-km at 51% of IETT cost. Therefore, based upon these estimates and allowing for the full 20% concessionary fares, minibuses would be covering only about 88% of their costs. However, Sanli's interviews suggested that there was a 12% profit on revenues. The difference between a 12% loss and a 12% profit is, of course, considerable, but in view of the sources of the data, not unbridgeable. The obvious sources of discrepancy are: (a) minibus costs have been much overestimated; (b) minibuses have higher load factors; and (c) fare leakages are lower for minibuses.

ANNEX 4

PUBLIC AND PRIVATE BUS COSTS IN THE NEW YORK CITY AREA 1974-1975  
OPERATING COST/VEHICLE HOUR (Burbank 1976)

Operator	Number of Buses <u>/a</u>	Operating Cost/Vehicle Hour <sup>/b</sup>	
		1974	1975
<u>Public Operators /c</u>			
New York City Transit Authority	2,424	\$22.80	\$24.51
Metropolitan Suburban Bus Authority	310	17.85	16.21
<u>Weighted Average</u>		22.14	23.82
<u>Private Operators</u>			
Transport of New Jersey	1,422	22.40	24.31
Maplewood Equipment Company <u>/d</u>	256	18.97	18.77
Green Bus Lines, Inc.	209	14.92	15.00
Queens Transit, Inc.	201	17.07	19.40
Triboro Coach Company	185	15.69	16.11
Jamaica Buses, Inc.	133	19.58	22.16
Steinway Transit, Inc.	123	19.32	23.04
Westchester Street Transp. Co.	94	15.06	17.24
Club Transportation Co.	66	17.07	18.58
<u>Weighted Average</u>		19.76	21.40

/a From "Transit Data by Urbanized Area," compiled by J. P. Jones, Urban Mass Transit Authority (UMTA).

/b Data from UMTA survey of 25 largest urbanized areas, spring 1976.

/c MABSTOA, an 1,800 bus public operator, is omitted because of contradictory data.

/d Subsidiary of Transport of New Jersey.

Selected Bibliography

AUSTRALIA

Wallis, I.: Private Bus Operation in Urban Areas--Their Economics and Roles. R. Travers Morgan, Pty. Ltd., Australia 1979.

BANGKOK

"Baht Bus fares up by Half," Bangkok Post, July 24, 1979 .

Jamieson KcKay and Partners: "Personalized Public Transport in Cities in South East Asia." Transport and Road Research Laboratory, Crowthorne, Berkshire, 1979.

CALCUTTA

Business India Calcutta Transport: Going Downhill, July 23-August 5, 1979, pp. 53-58.

Calcutta State Transport Corporation (CSTC): Transport Statistics, Calcutta, July 1978.

Commerce: Restructuring Calcutta, Bombay, August 5, 1978, vol. 137, #3504.

\_\_\_\_\_ Urban Transport in India, Bombay, May 5, 1979, vol. 138, #3542

Roth, G.: "Calcutta's Experience," letter to editor, New York Times, July 14, 1979.

Thomas, T. et al.: "Travel and Public Transport in Calcutta." Urban Transport Research Group, Warwick University, U.K. 1977.

\_\_\_\_\_ "Travel Survey, Calcutta--Winter 1976-197." Warwick University.

ISTANBUL

Sanli, H.I.: "Dolmus-Minibus System in Istanbul: A Case Study in Low Cost Public Transport, Istanbul." University of Istanbul, 1977. (processed).

NEW YORK CITY REGION

Burbank, C.: "Comparing the Efficiency of Privately- and Publicly Owned Bus Systems." Urban Mass Transit Authority, U.S. Department of Transportation, Washington, D.C., December 1976.

Selected Bibliography (Continued)

GENERAL

- Bly, P.H.; Pounds, S.: and Webster, F.V.: Report on "Study of Financing of Urban Public Transport." Organization for Economic Cooperation and Development, Paris, France, January 1979.
- Fouracre, P.R.: "Intermediate Public Transport in Developing Countries." Transport and Road Research Laboratory Report No. 772, TRRL, Crowthorne, Berkshire, 1977.
- Fouracre, P.R., and Mauder, D.A.C.: "Intermediate Public Transport in Third World Cities," for PTRC Annual Meeting, Warwick University, 1979.
- \_\_\_\_\_. "Public Transport in Chiengmai, Thailand." Transport and Road Research Laboratory Supplementary Report No. 285, TRRL, Crowthorne, Berkshire 1977.
- \_\_\_\_\_. "Urban Public Transport in Chiengmai, Thailand." (Reprint) Traffic Engineering and Control, vol. 18, No. 5, May 1977.
- Jacobs, G.; Fouracre, P.R.; and Maunder, D.A.C.: "A Comparison of Bus Operations in Cities of Developed and Developing Countries." Traffic Engineering and Control, June 1979, pp. 306-314.
- Kirby, R.: Tolson, F.: Supporting Mass Transportation in Small Urban Areas Through User Subsidies: A Demonstration in Danville, Illinois. The Urban Institute, Washington, D.C. 1978.
- Lim, W.Y.: A Comparative Study of Public Transport in Principal Asian Cities. World Bank report, 1978.
- McLeod, W.; Walters, A.A.: "A Note on Bankruptcy Rates in Road Haulage Industry." Journal of Industrial Economics, 1966.
- Miller, G.: Taxicab Services to Bus Transit. The Urban Institute, Washington, D.C. 1977.
- Walters, A.A.: "Costs and Scale of Bus Services." World Bank Staff Working Paper No. 325, April 1979.



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