Transport Research Centre
Macquarie University

COMPETITION AND OWNERSHIP OF BUS AND COACH SERVICES:

AN INTERNATIONAL CONFERENCE

Thredbo Australia - May 1989

PAPER FOR WORKSHOP No.6: TechnicalWorkshop on Costing, Scheduling and Demand

"Costing and Productivity for Different Vehicle Types: An Analytical Framework"

by

Peter White

and

Roy Turner

Transport Studies Group
Polytechnic of Central London

Paper for 'Competition and Ownership of Bus and Coach Services : an international conference'

Thredbo, Australia, 1-4 May 1989

COSTING AND PRODUCTIVITY FOR DIFFERENT VEHICLE TYPES : AN ANALYTIC FRAMEWORK

Peter White and Roy Turner
Transport Studies Group
Polytechnic of Central London

1. INTRODUCTION

On an annual expenditure basis, the great majority of investment in the bus and coach industry is in vehicles. The Monopoly and Mergers Commission's investigation of four major British operators in 1982 showed that this represented over 90% of such expenditure (1). This has traditionally involved replacement of existing vehicles by new ones of similar size. In principle, depreciation accounting provides funds for this purpose (although with severe limitations, as described below). However, a wider range of options is now available. This is particularly true in Britain, where the adoption of minibuses of intensive urban service from the mid 1980s, and changes due to deregulation, have caused both a wider variety of vehicle types, and methods of financing fleet purchase, to be considered. Under these conditions, a more systematic method of evaluation is required. However, problems have also been caused by deregulation, notably in the uncertainty which deters normal replacement of full-size vehicles, and competitive pressures which may lead to failure to provide adequate funds for replacement.

This paper outlines recent changes in Britain, followed by a method for evaluating vehicle types and its application to the minibus concept.

2. FLEET COMPOSITION AND RATES OF RENEWAL

The latest estimate of the composition of the British psv fleet is that at March 1988, as shown on table 1 overleaf. London Buses Ltd and 'SBG' (the Scottish Bus Group companies) remain in public ownership, together with most of the 'Passenger Transport Companies' (PTCs) in the former metropolitan counties, and the 'municipal PTCs' under district or regional council ownership. All former National Bus Company (NBC) companies have been privatised, but retain a similar mix of operation, and are conveniently classified as a separate group. 'Independents' refers to those companies which have been in private ownership throughout, mostly small concerns of 1 to 15 vehicles.

Table 1 : Provisional estimates for the composition of the British bus and coach (psv) fleet at March 1988

(Thousands)

OPERATOR GROUP	SINGLE DECKERS by seating capacity : up to 16	17-35	36 plus	ALL	DOUBLE-DECKERS	TOTAL
London Buses Ltd.	-	0.3	0.3	0.6	4.4	5.0
Metropolitan PTCs	-	1.1	0.7	1.8	6.7	8.4
Municipal PTCs	-	0.5	1.2	1.7	3.7	5.4
SBG	-	0.3	1.7	2.0	1.1	3.1
Ex-NBC companies	1.7	2.2	6.5	10.4	5.9	16.3
Independents	6.0	3.4	20.9	30.4	2.3	32.6
All operators	7.8	7.7	31.3	46.8	24.0	70.8

Source : Department of Transport (London) Statistics Bulletin (88) 54 'Bus and Coach Statistics Great Britain 1987/88 (provisional)' Table 6.3.

The fleet total of 70,800 above compares with one of 76,900 in 1975, which fell to 67,800 in 1985/86 , then rose by 3,000. The growth was entirely in single-deckers, with those of 'up to 16 seats' rising from 6,500 in 1985/6 to 7,800 in March 1988 (in turn corresponding closely to a growth in such vehicles among ex-NBC companies of 1,200 over that period) (2).

The '17-35 seat' vehicles listed above would fall mostly in the 'minibus' category (mostly based on normal-control light goods chassis such as the Mercedes 709, and similar purpose-built buses such as the MCW Metrorider), although a few 'short' traditional buses may also be included. Further comment on minibus growth is made in section 3 below.

Assuming that a total fleet of approximately this size is maintained in future, what annual renewal rate would be needed? The industry has traditionally worked on a life of about 15 years for full-size 'heavy' buses, and this is assumed below. An average close to this was observed in the 1970s (3). That for minibuses is still unclear, but earlier estimates of 4-5 years now appear pessimistic. Six years is assumed below.

An initial estimate of the British annual renewal requirement thus becomes :

Minibuses (i.e. all vehicles under 35 seats)	2,600
Full-size single-deckers (i.e. all of 36 seats plus) and double-deckers	3,700

The minibus delivery rate is slightly below this figure but the full-size total is still well below that needed. In 1988 calendar year about 2200 minibuses and minicoaches were placed in service, together with about 750 full-size buses, and 1300 full-size coaches (4). The 'full-size' figure has recovered from its nadir of about 1400 in 1987, but is still little more than

half the rate needed at a 15 year life, and corresponds to a 25-30 year average life.

At a cost of slightly over £1,000 per seated passenger space, then both in terms of capacity and initial cost, one full-size bus is equivalent to about three minibuses. At an average price of, say £75,000 for a full-size bus or coach, and £25,000 for a minibus, the annual expenditure on new vehicles in 1988 was around £220 million. Note that these figures are averages for buses, and will thus tend to understate the total when high-specification coaches are considered. As shown in Figure 1, the £220 million figure compares with with that needed of about £340 million (the difference being that for replacement of full-size buses on a 15-year life) - an 'investment gap' of £120 million.

Even a 15-year life could be considered a rather long one, given lives of 8-10 years typically used in road freight operation.

Local bus deregulation has obviously caused instability in the market for full-size buses as such, from which a partial recovery has occured. However, the coach market has also been below normal replacement size for some years, perhaps as a result of rates being depressed by intense competition.

The manufacturing sector in Britain has become increasingly dependent on the home market as traditional export markets have declined or been lost to other countries. From a high level of demand in the late 1970s, encouraged by new bus grant, sales fell to a very low level by the mid 1980s. This was most evident in the traditional 'full size bus' sector, but also in the coach market, despite the growth in scheduled services attributable to the 1980 Act.

Some of the decline in 'full size' deliveries may be attributed to contraction in some fleets, as operators cut back peak output, and also the move to minibuses, but most reflects the uncertainty due to deregulation, and the increased cost to the operator of buying new vehicles as bus grant was phased out between 1981 and 1984.

In the first phase of deregulation, many operators have extended lives of existing stock, or relied on secondhand vehicles (the latter being typical of many tendered operations). Such a policy can only be sustainable in the short term. There is a danger that rising maintenance costs of an ageing fleet will offset some of the efficiency gains recently made.

It could be argued that the bus industry is in decline, and hence new deliveries need not match withdrawals. However, given the claim of the 1984 'Buses' White Paper (Cmnd 9300) that it was aiming to reverse a long period of decline in the industry, it is difficult to see how a stable (let alone growing) industry could manage without renewal of capital stock.

The manufacturing sector remains fairly depressed in Britain. While the task of providing an attractive vehicle specification is clearly that of the manufacturer, government also has some responsibility in setting the environment in which it works. Other European manufacturers, competing strongly for the remaining British market, have had more stable home markets on which to base research and development work. For example, the Leyland Lynx is now proving popular with many operators, and substantial orders are at last being received. However, the need for a new urban single-deck design was

recognised several years ago, leading to the R&D work described by Hancock (5). The opportunity to recoup this investment was delayed for at least two years, during which Leyland Bus experienced two changes of ownership.

4. METHODS OF FUNDING FLEET RENEWAL

Traditionally, bus operators have funded fleet renewal through outright purchase, buying from revenue or with fixed-interest loans. Much emphasis was placed in bus costing techniques in the late 1970s/early 1980s on full-cost replacement depreciation for this purpose. Finance leasing has also been used, its extent varying mainly with tax benefits. For example, at one time in the early 1980s this technique was advantageous for metropolitan Passenger Transport Executives, but not for district council operators.

Under reorganisation and deregulation, bus operators' cash flow considerations have become predominant, and may no longer permit outright purchase in most cases. As shown in our other paper at this conference, analysis of data from 1985/86 to 1987/88, suggests that although costs per bus-kilometre have fallen by around 20% in real terms (excluding depreciation and/or leasing charges), the combination of falling total traffic and rapidly rising bus-kilometres run has resulted in a sharp drop in average loads, giving a negligible fall in average real operating cost per passenger trip outside London. Apart from the metropolitan areas, real revenue per trip rose only marginally. The ability of the industry to absorb the reductions in public expenditure may have been made possible by reverting from replacement to historic depreciation, following the failure of accounting practice in Britain to sustain the shift of the 1970s toward use of replacement costing. Some operators may not even be able to meet historic depreciation, although still able to maintain a positive cash flow on operating costs in the very short run, and thus survive periods of intense competition.

In response, the manufacturing sector has developed innovative packages. These began in the minibus field, in which the mass-produced van chassis generally used can be maintained through a local dealer, rather than the operator himself. A contract charge, covering both supply of vehicle, and maintenance costs is set, usually at fixed rate per unit of time, within an estimated distance run. The operator thus avoids the initial capital costs of buying vehicles, can reduce his own investment in depots and workshops, and can predict with greater accuracy his maintenance costs (the latter, as set by the manufacturer, are not necessarily the real resource costs, but may be a rather low figure set to encourage demand for the vehicle). This effectively lowers barriers to entry to the market by new operators.

This approach has become increasingly popular in minibus operation - for example, most of the United Transport 'Zippy' Preston fleet was supplied on a contract basis, with very limited facilities being provided by the operator. Another variation, practised by London Regional Transport as tendering authority for an intensive minibus route into central London, is to own the vehicles itself and then provide them to the tendering operator at a nominal charge, thus avoiding the need for a large initial investment by potential bidders.

Greater flexibility is also now evident in supply of full-size buses. Firstly, through a shift to operating leases, in which the need for capital investment

is avoided. Secondly, arrangements are now offered by several manufacturers and dealers in which maintenance is provided through a fixed-rate contract. Leyland and Volvo have supplied buses on this basis, the former at a fixed monthly charge, the latter at a mileage rate. Maintenance is still carried out by the operators in question, being of a more specialised nature than that for minibuses, but costs are reimbursed by the manufacturer. The first example was in the supply of Lynxes to Merthyr Tydfil Transport by Leyland in 1986 followed by 36 Volvo B10M and D10M models to Badgerline's Weston-super-Mare depot in 1987. Useful reviews are provided by Gibbins (6) and Rowlands (7).

Another example of leasing is the arrangements now proposed by National Express, almost all of whose services are operated by other companies on contract. A wide variety of ageing vehicles is now used. In conjunction with a a major dealer and two manufacturers, NE has set up a scheme in which a standard coach will be supplied under an operating lease with maintenance contract to all its contracting operators, enabling them to renew their fleets without the cash flow problems that could otherwise occur (8).

A particular attraction of operating leases (with or without a maintenance contract) is that such assets are 'off balance sheet' under British rules (whereas vehicles on finance lease must now be shown). Increasingly short-term hiring is now possible, with weekly and monthly rates being quoted by advertisers.

This increased flexibility in funding is most welcome. Nonetheless, lessors must cover their own costs (including the high interest rates now prevailing) and thus set realistic rates. Even if operators no longer have to fund outright purchase, they must still be able to meet these charges which could be considerably higher than current, short run, costs of running secondhand or elderly vehicles. Tender prices and commercial fares may thus increase as a result. The ability of local authorities to absorb the former is questionable, given the pressures now placed on their budgets.

In order to fund the required rate of fleet replacement, the operating industry needs to increase its profitability, preferably without real fare increases. This could come about through some reductions in the very high service levels currently offered in some areas, enabling an increase in average load per vehicle-km. If efficiency gains are retained, revenue per bus-km would rise without the need for real fare increases. However, current government expenditure plans involve reduction of both local authority revenue support and concessionary fares expenditure in real terms, which may absorb any improvement in financial performance before additional funds become available for fleet replacement.

5. THE GROWTH OF MINIBUSES

The independent sector has traditionally operated several thousand minibuses, mostly for private hire and contract work, although a limited number is operated on scheduled local services. A much larger minibus market also exists for non-psv vehicles, often produced by the same manufacturers.

The growth of minibus numbers within the current and former 'public sector' fleets began with the intensive service launched in Exeter by Devon General in February 1984. Rapid growth followed, first in NBC companies, then among PTCs

and SBG. From about 1000 buses of under 36 seats in 1985/86 (annual average) in these fleets, the total had grown to about 6,100 by March 1988, according to Department of Transport figures (2).

This phenomenom has been examined by us at PCL under contract to TRRL. Phase one was published by TRRL in 1987 (9) and work on phase 2 is now being completed. The work has included a catalogue of minibus operations in Britain - by date of introduction, operator, location, and number & type of vehicles. Collated from reports in the technical press and discussions with operators, it enables the rate of growth and type of vehicle used to be identified more closely than in the aggregate DTp statistics.

Figure 2 shows the cumulative growth of minibuses used on local bus services thus derived. Particularly rapid growth was evident from around month 20 (September 1985), as many ex-NBC companies followed Devon General's lead, with a further spurt at deregulation in October 1986 (month 34). By December 1987 about 5,600 were in use. In 1987 calendar year alone, about 2,500 minibuses entered service on local bus operations. Provisional estimates suggest a slower rate of growth in 1988, to about 7,200 by the end of that year.

Figure 3 shows the composition of the minibus market by vehicle type. The domination by 16 to 20 seater small vehicles, such as the Ford Transit and Freight Rover Sherpa, was initially challenged by slightly larger Mercedes models, such as the 20-seat 608D. By late 1986 the Transit/Sherpa share was shown to about 50% of the total, with the most rapid growth being shown by the models seating around 25, such as the Renault (Dodge) S.56, Optare CityPacer and MCW Metrorider. This trend is thought to have continued subsequently, with further increases in size through the 'stretched' Metrorider and Mercedes 811 models, seating over 30.

The larger models are deployed mainly in conurbatiom settings, where fluctuations in demand require larger vehicles, and existing service levels tend to be higher, giving less justification for the threefold frqeucny increases found in earlier conversions.

Within the totals shown, some operators have redeployed smaller models, when they have been replaced by bigger vehicles (for example, Transits displaced by CityPacers in Cambridge were used to start a new service elsewhere in Cambus territory at Stamford). Some have sold off smaller models in favour of larger types, although the vehicles in question usually remain in service elsewhere. Some further net growth in minibus numbers may continue, notably in Scotland and Northern Ireland (where labour recruitment is less of a problem than in the South East). In other cases, operators are reverting to full-size vehicles where problems have been found - for example, on trunk radial routes in central Leeds.

Allowing for some further growth, the eventual 'steady state' replacement level for minibuses might be around 3,000 per year (including 'coach' versions for independents) rather than the 2,600 suggested above, but with earlier small types being replaced by larger models rather than identical vehicles.

6. RELATIVE COSTS OF DIFFERENT TYPES OF BUS

Mention has been made already of the unsatisfactory nature of depreciation

provision as a means of funding replacement, and the fact that 'like for like' replacement is not necessarily the case. A more satisfactory approach is to treat each investment decision as a new one, trading off future cost components, and also taking into account revenue-generating potential of different types.

The development of 'whole life costing' is part of this process, in which all costs (not initial purchase alone) are assessed. For example, a higher cost vehicle may give lower total costs due to improved fuel consumption, lower maintenance costs, etc. For this purpose a common base is needed, usually derived by discounting to a base year, as in other forms of transport investment appraisal. In our calculations, the initial price (or first year of lease) is treated as undiscounted, together with the first year's operating costs and revenues. Subsequent costs and revenues are then estimated annually, and discounted at a commom rate.

The methodology described above has been used primarily to compare minibuses and full-size buses, where minibuses are purchased as the replacement vehicles in place of new full-size vehicles. However, the same method may be used for any vehicle type or size (including, for example, purchase of second hand crew-operated vehicles, or high-capacity articulated single-deckers). They are set up as a standard spreadsheet.

A real discount rate of 5% was used. This would now be considered rather low, even within the public sector in Britain. Clearly, the higher the rate chosen, the less emphasis will be placed on long-run operating cost savings and revenue gains, while short-life vehicles with a lower initial captial cost will emerge more favourably.

Elements of cost will now be considered in turn.

Capital cost per vehicle is around £25,000 for a 20-25 seat minibus, and about £75,000 for a full-size urban bus (75-seat double-decker with about 10 standing), or slightly less for a high capacity single decker (50 seated, 20 standing) such as the Leyland Lynx. Examples may be obtained readily from the technical press, although discounts obtained by some operators may be less explicit.

Maintenance costs are difficult to estimate. They are not covered in technical press reports, nor do operators' own costing systems necessarily identify different types clearly. Averages for large buses were derived from existing research. So far as urban minibuses are concerned, none have yet reached the end of their expected lifespan for the new style of operations to which they are now applied. Hence an overall cost per km. over the whole life cannot be observed. Some very low figures have been quoted for vehicles during the first year or so of operation, but often major parts are still under warranty. In our earlier calculations, a fairly wide range was used for sensitivity tests, of 10p to 14p per km. for minibuses, and around 20p for large buses, both including tyres, lubricant and cleaning costs.

Minibus maintenance may be contracted out - for example, to Ford dealers - and even where undertaken directly by the bus operator incurs much lower costs than for full size buses. Spares, being mass produced, are cheap and also readily available from local dealers, reducing inventory costs. Mechanics with

skills appropriate to such vehicles may be recruited more easily than those for large buses.

Where vehicles are obtained on an operating lease (with or without a maintenance contract), the lease charge is included as a annual figure in the spreadsheet. Likewise, a single annual maintenance charge per vehicle (or combined lease/maintenance total) may be shown, instead of maintenance costs directly related to distance run. Not only does the operator avoid the need for major investment in depots and workshops, and outright purchase of vehicles, but he can also predict with greater certainty his operating costs (the manufacturer or dealer accepting some of the risk in future maintenance costs as a means of selling the vehicle)..

This flexibility may enable minibus operators to run with a smaller spare margin of vehicles over peak vehicle requirement - around 10%, rather than 15%, although some very tight margins of under 10% found within the first year of some NBC operations may be expected to rise as vehicles age.

As a rough guide, a combined operating lease with maintenance contract would cost around £180-200 per week for a minibus, and £300-400 for a full-size vehicle, but will vary according to individual deals. However, some costs of routine cleaning, etc. would have to be added to this to compare with the overall distance-based cost in our calculations. Operating leases and maintenance contracts are not necessarily cheaper than outright purchase and direct maintenance, but the balance will vary according to the type of service operated and circumstances of the operator.

Fuel consumption averages around 15-20 litres per 100 km (15 - 18 miles per gallon) for minibuses, and 30-40 litres for full-size vehicles : examples may be obtained from published road tests, or in discussion with operators .

Driver costs. The present scale of minibus operation would be impossible but for the radical change in the labour market since the late 1970s. The rapid growth in unemployment, reduced age for PSV drivers (from 21 to 18 under the Transport Act 1980), and shift from national to local negotiations between operators and trade unions have made it possible to recruit staff much more easily, and to offer differential wages and conditions for minibus and full-size bus drivers.

Until recently, wages and conditions were determined through union/employer national joint councils. This had the effect of introducing standard basic conditions over the whole country, irrespective of local labour market conditions, i.e. in some areas a higher rate was being offered than necessary for drivers of full-size buses. Beginning with the Exeter minibus services, special local agreements were negotiated between unions and the individual operator concerned. Minibus drivers were generally paid a lower basic rate, and under more flexible conditions than previous agreeements, for example regarding overtime work, meal breaks and sign-on/sign-off time. Special agreements have also been made by other operators running minibuses. A further factor is that the weekend, evening and overtime wage rates under minibus agreements may be little higher (if at all) than basic rates, unlike traditional working agreements for full-size buses.

The effect of such agreements has been to reduce costs per minibus driver hour

by about 20% compared with full-size buses, and sometimes more where previous conditions were inflexible. Coupled with higher average running speeds of minibuses due to lower total boarding time and greater manouverability (about 10%), the overall impact was to reduce driver costs per vehicle-km by about 30% compared with full-sized buses.

For example, in 1986, minibus drivers were usually paid between £2.25 and £3.00 per hour, although higher in some cases . It should be borne in mind, however, that many of these variations reflect the regional labour market. The South-West is a low wage area, as revealed in the annual New Earnings Survey. In London and the South East, minibus drivers may be paid substantially more than drivers of full-size buses elsewhere.

As the national negotiating framework for all bus operators has now broken up, much greater variety in wages and working conditions has occured in all types of work, and insofar as minibuses pioneered this type of agreement, the differential between minibus and full-size bus work is diminishing. However, the differences in skill and easier recruitment for minibus work could be seen to justify some long run differential - but perhaps 10% rather than 20%. This will reduce its cost advantages vis a vis full-size buses, and hence change the cost ratio when they are directly replaced.

Table 2 shows our estimates made in 1986 of total costs for providing a similar capacity of service on an urban radial route, using a conventional bus (Leyland Lynx with 72 places) and smaller types of minibuses (Ford Transit or Mercedes 608D) to give approximately trebled frequency.

Table 2 : Daily total costs, service levels and demand for a range of bus types

	Bus type (and capacity)		
	Leyland Lynx (72)	Transit (20)	608D (25)
Total costs (£)	1570	2810	2580
Bus hours operated	92.5	255	223.5
Bus-km. operated	1670	5400	4320
Cost per bus-km (pence)	107	52	58
Assumed base demand (pax trips)	4600	-	-
Break-even fare (pence)	34	34	34
Pax. trips at break-even fare on minibuses	-	8260	7590
Average pax. boarding per bus-hour	50	32	34
Peak vehicle requirement	14	50	40

A route of 9 km length was assumed, with a round trip running time of one hour for full-size buses, or less for minis. Note that in this case all types of buses were assumed to meet the whole of a fairly peaked demand. As labour and maintenance costs were simply pro rota to time and distance, no serious distortion would occur, but capital costs could be slightly overstated

compared with the more common pattern of 'flat profile' minibus working.

The simple replacement by minibuses, to give about the same capacity, increases total costs (and likewise unit cost per passenger-place-km) by about 80%, i.e. each minibus-km costs about 60% that of a full-size bus (at a 20% wage differential).

If table 2 represents an existing operator replacing his own services at much higher frequency, then we can show what increase in revenue is needed to ensure that financial performance is at least as good as that before. If, for example, the previous conventional service broke-even, then the revenue would have to rise in the same proportion as costs, i.e. by about 80%. Assuming that average fare per trip is unchanged (true in almost all cases to date), then the number of trips must rise in the same proportion. We can then calculate an elasticity of demand with respect to bus-km run to satisfy this condition. In this case:

$$\frac{80\% \text{ (increase in trips)}}{200\% \text{ (increase in bus-km)}} = +0.4$$

A general formulation was developed for this term, known as the 'balancing elasticity' (i.e. that giving the same ratio of revenue to costs as before). Where a service did not break-even before, but this was the desired outcome, then a different 'break-even' elasticity is calculated, for which a general formulation was likewise derived (9). For example, if the aim was to bring a loss-making service to break-even, a higher elasticity would apply. If a currently profit-making service (for example, one cross-subsidising rural routes) was converted, then a lower elasticity would suffice to meet break-even conditions. Although profits would be reduced to a 'normal' level, the higher frequency could deter competitors from emerging.

Estimates of total minibus and 'large bus' operating costs produced in our earlier work are in process of being updated. However, the overall picture does not appear to change, i.e. total cost per bus-km for a minibus (including vehicle replacement for a 5/6 year life) is about 60% that for a full-size bus (including replacement).

As average minibus size has grown, a two-for-one substitution ratio may give the same capacity as the previous big bus service. Although cost per minibus-km will be somewhat greater than for the smaller types shown above, a lower elasticity is required to break-even (e.g. if 'large minibuses' had a cost per km 65% that of the large buses, then total costs would rise by 30% for a 100% service level increase, implying a break-even elasticity of +0.3). In some cases, 'one for one' substitution is now occuring, where peak capacity of a 'large minibus' is deemed sufficient by the operator, and costs are saved through lower driver wages, fuel costs, maintenance, and so on.

Since our earlier work, there is some evidence of absolute unit cost changes. Fuel costs per litre (net of duty) fell by over 30% in real terms between 1985/86 and 1987/8, as shown in our other paper (although now rising again). Maintenance costs both for minibuses and large buses may be lower than in our earlier estimates. This is partly due to gains through contract maintenance arrangements (see above), but also to general efficiency gains since deregulation, in which operators have cut maintenance staff by about 20% while

bus-kilometres rose by over 10%. On the other hand, wage levels are starting to rise as recruitment becomes more difficult, and some of the exceptionally large differentials between minibus and large bus wage rates have disappeared. Even the typical differential of 20% may be substantially reduced in areas where staff turnover is rising.

The overall ratio of minibus to large bus costs does not seem to have varied greatly as a result, although both are now lower in real terms. The drop in maintenance costs relative to initial capital costs may imply a longer optimal vehicle life than previously assumed (if, indeed, it was optimal), both for minibuses and large buses.

However, major uncertainty remains as to the long-run maintenance costs of minibuses, and sensible replacement life, which only further experience will resolve.

7 CONCLUSIONS

Recent British experience has shown that a much wider range of vehicles for intensive urban service may now be considered, accompanied by more flexible financing and maintenance arrangements. However, where minibuses are used to provide a similar total capacity to that offered by large vehicles, substantial traffic growth is needed to cover the extra costs incurred, corresponding to a service level demand elasticity of +0.3 to +0.4.

A fundamental problem remains in that the current rate of fleet replacement for large buses is well below that required even to give the 15-year life previously found. Substantial extra investment is needed in new vehicles.

References

1. Monopolies and Mergers Commission. A Report on Stage Carriage Services supplied by Bristol Omnibus Co., City of Cardiff, Trent Motor Traction and West Midlands PTE. HMSO, London, July 1982, chapter 9.

2. Department of Transport Statistics Bulletin (88) 54 'Bus and Coach Statistics Great Britain 1987/88 (provisional)', December 1988. Tables 6.1 to 6.3.

3. M.P.Higginson and P.R.White 'The Efficiency of British Urban Bus Operators'. Research Report no. 8, Transport Studies Group, Polytechnic of Central London, 1982, chapter 6.

4. SMMT 1988 estimates quoted in 'Bus Business' 25 January 1989, page 9, and provisional estimates for 1988 by Paul Heels (independent researcher).

5. B.S.Hancock 'The Leyland Lynx' Paper C220/86 at Institute of Mechanical Engineers Conference 'The Bus 86', 1986, London, 181-191.

6. Eric Gibbins 'Operating leases and SSAP21' Bus and Coach Management Aug/Sept 1988, p 40.

7. P.Rowlands 'Leasing - a leap into the future' in 'Financing your fleet' Bus Business special supplement 27 July 1988, p 3 (and see specific examples on pp 4,5 and 8),

8. 'Minister launches new Expressliner'. Coachmart 23 March 1989, p 10.

9. R.P.Turner and P.R.White. NBC's urban minibuses : a review and financial appraisal. Contractor Report 42, Transport and Road Research Laboratory 1987.

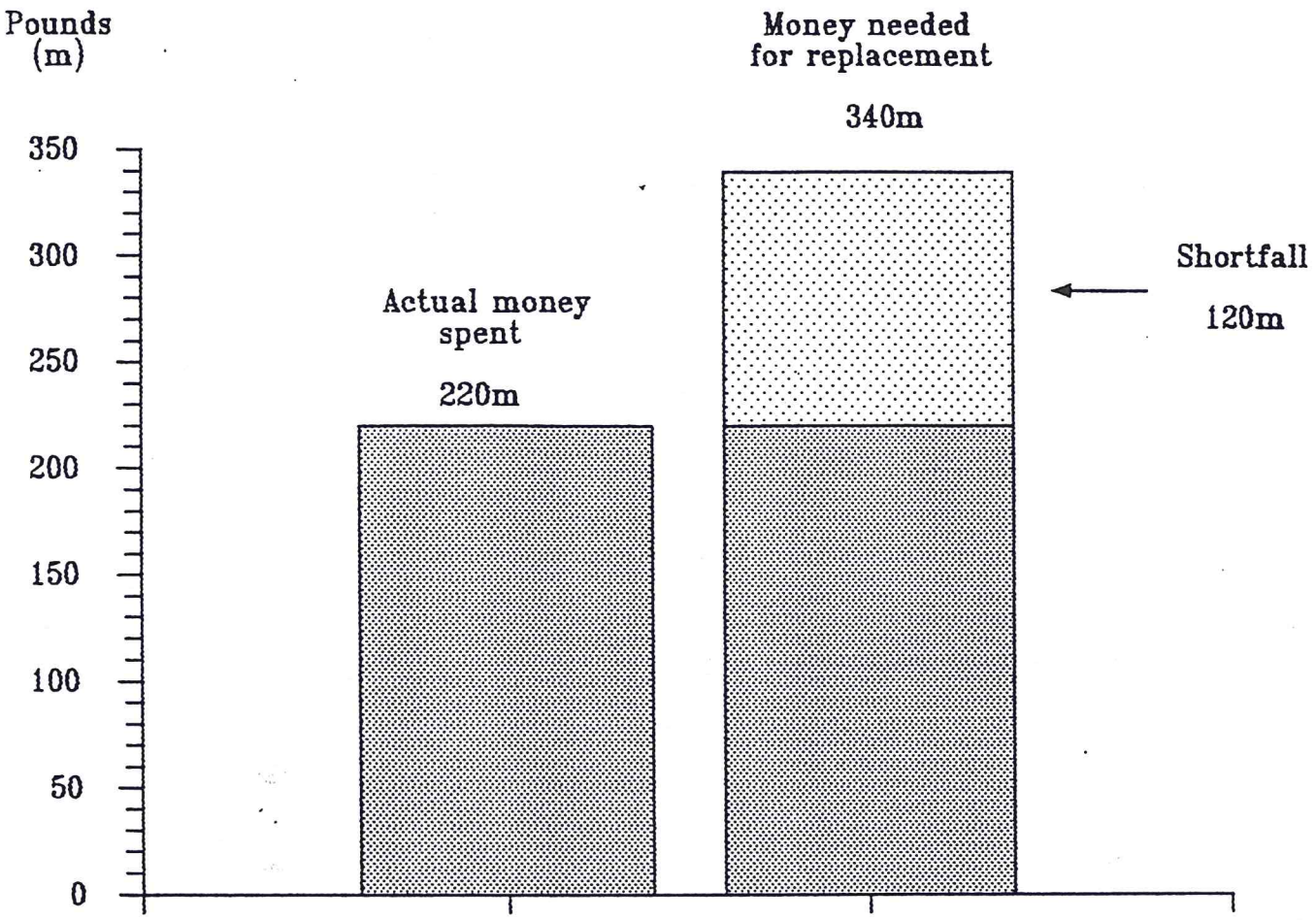


Figure 1 : Investment in new buses and coaches in Britain in 1988, compared with that required for normal replacement lives

Figure 2 : Growth of urban minibuses in Britain (all types) 1984-1987

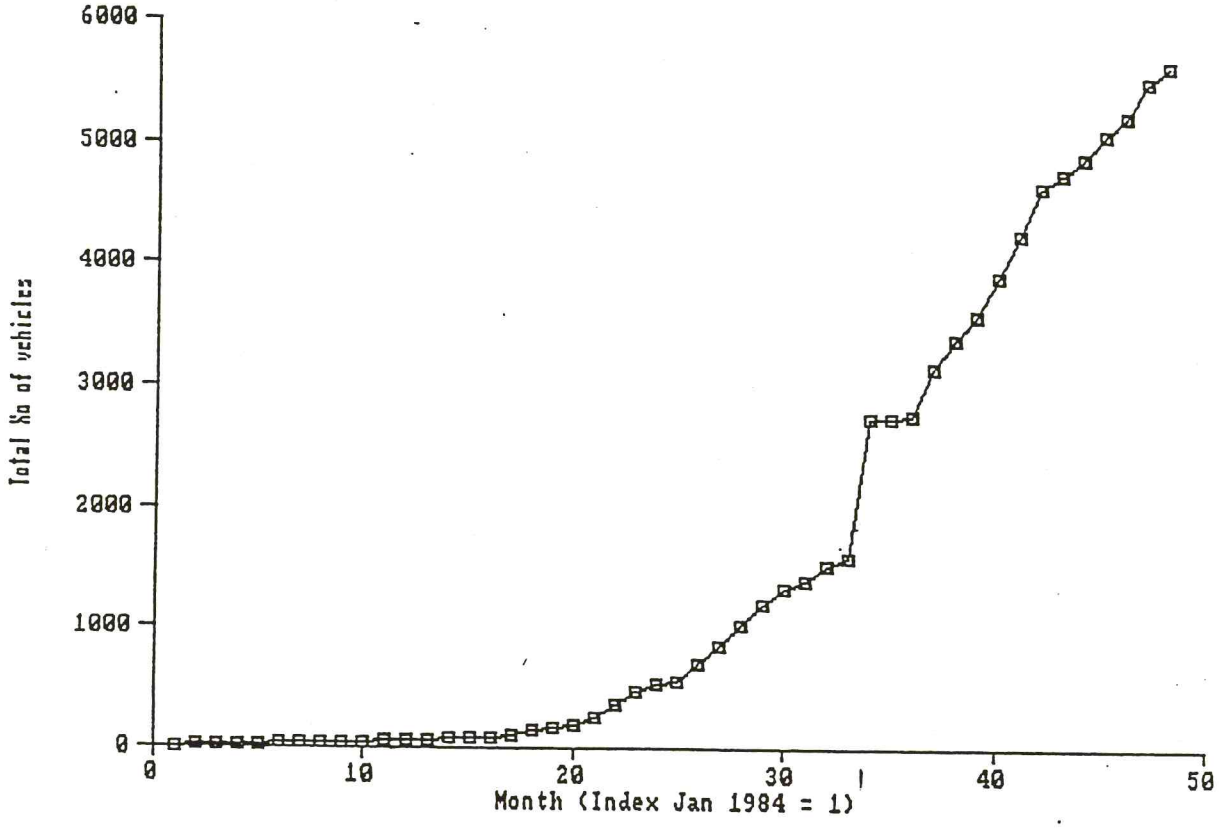
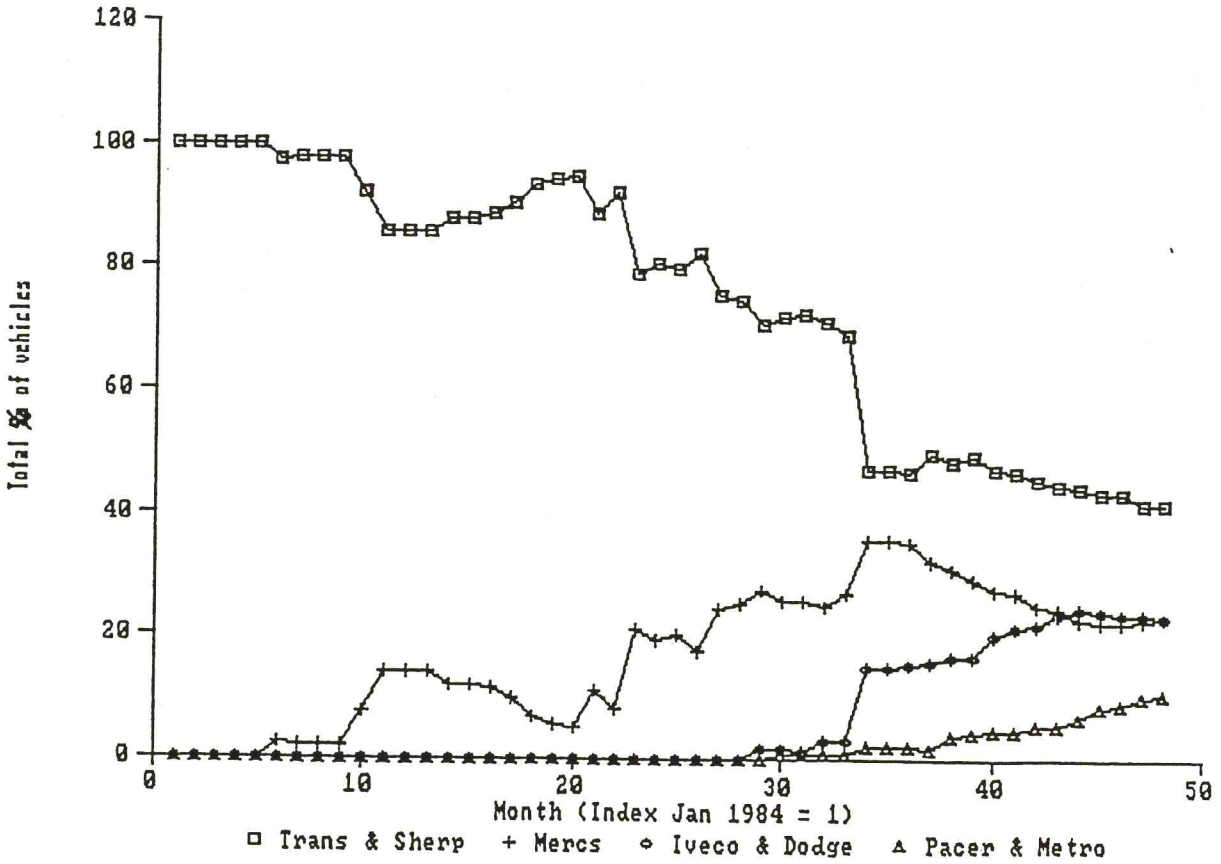


Figure 3 : Cumulative market share of minibus types in Britain, 1984-1987



'thredbo5'

A supplementary note on public expenditure, costs and profitability

1. Revised figures issued by the Department of Transport show that revenue support through local authorities was marginally lower than originally stated (due entirely to revisions in the Scottish figures), at 1987/8 prices now shown as £353 million in 1985/6 (previously £354 million) and £213 million for 1987/8 (previously £218 million). They amend the top line of table 4. The effect on conclusions drawn in the paper is negligible.

2. Total revenue figures for 1987/8 have still not yet appeared. However, provisional estimates can be made by reference to patronage and fare index trends. Estimates for total operating cost have also been made using data in Statistics Bulletin (88)54, to show the difference thus observed. Results are shown below. They exclude operations in London, and fuel tax rebate.

£ million	Year				
REVENUE	1985/6	(@ 87/8)	1986/7	(@ 87/8)	1987/8
From users :					
Met PTCs	396		407		
Muni PTCs	212		210		
NBC cos	539		538		
SBG	122		121		
Independents	79		95		
Total	1348	1467(a)	1371	1443(b)	1414 (c)
Payments from local auths.	325	353	274	289	213
Concessionary fare comp'n.	212	231	218	229	242
Rural grant	-	-	17	18	17
TOTAL INCOME		2051		1954	1886
Total operating cost (d)		1803		1692	1598
Difference		248		287	288

Notes

(a) Conversion from 1985/86 to 1987/8 prices by GDP deflator ratio (110.0/101.1 = 1.088)

(b) Conversion from 1986/87 to 1987/8 prices by GDP deflator ratio (110.0/104.5 = 1.052)

(c) An approximate estimate, based on a 2% fall on the 1986/7 figures at 1987/8 prices (i.e. total trips fell by 2.4%, the money fares index rising from 105.3 to 109.5, and RPI from 104.4 to 108.6)

(d) Based on total vehicle-km operated outside London (table 1.1 of Statistics Bulletin (88) 54) multiplied by £1.0 per km in 1985/6 (at 1987/8 prices). £0.9 per km (ditto) in 1986/7, and £0.78 per km in 1987/8 (the last being derived from the 22% drop between 1985/6 and 1987/8 in real terms, shown in column I of the spreadsheet).

Revenue figures for 1985/6 were derived from 'Transport Statistics Great Britain 1976-1986' table 2.34 (c), and for 1986/7 from Statistics Bulletin (88) 29, table 2.34(c).
The local authority expenditure, concessionary fares compensation and rural grant are taken from Statistics Bulletin (88) 54.

3. The 'difference' does not represent a profit as such. It is required firstly to meet depreciation and leasing charges not covered in the operating cost defintion. These are of the same order (see our other paper at this conference). In addition, it would also have to meet dividends on capital other than fixed interest charges.

The total operating cost figure in particular is highly approximate, especially as regards the independents. If, for example, the 87/88 figure were 25% below that (for the whole industry) in 85/86, total operating cost would fall to £1537 million in 1987/8, giving a difference of £324 million.

Actual profitability would also be affected by non-local bus activities (both in revenue and cost). This is particularly true for the independents.

4. Outside London, very few published accounts are available. However, it is known that the Scottish Bus Group, severely affected by competition, fell from a profit of £1.026 million in 1986, to a loss of £3.567 million in 1987, on a turnover in the latter year of £155 million (these figures are after income from grants and concessionary fares compensation, and historic cost depreciation) (Source Scottish Transport Group Annual Report 1987, page 39).

5. The extent to which financial performance of the industry was improved by real fare increases, mainly in the PTEs, may also be considered. Given the real increase of 28% in fares in the metropolitan counties (cell L2 of the spreadsheet), the expected passenger fall, had service levels been unchanged, would have been about 11% (i.e. 3% trend decline over two years, and a -0.3 elasticity applied to the real increase). A net revenue growth of about 13% would thus have been expected. On a base of £396 million revenue in 1985/6 (see table above), an extra £45 million revenue would have been produced (about half the net reduction in public spending in the metropolitan counties).

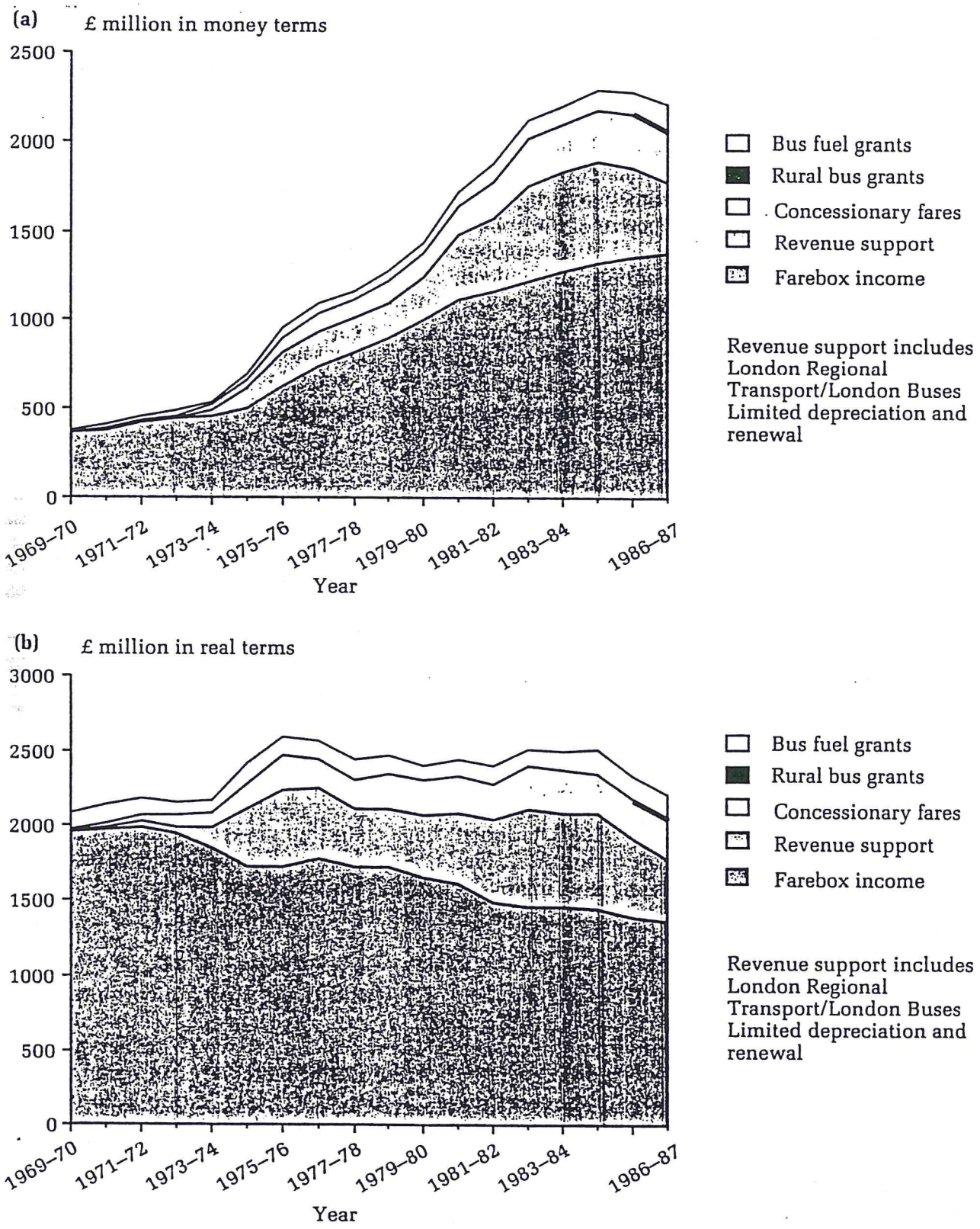
6. Since the paper was written , the National Audit Office (NAO) has produced a report on the effect on the fuel duty rebate*. This contains some useful diagrams showing components of total income for local bus service operators (including grants, etc) which are reproduced in this note, and as colour slides in presentation. However, they also include London and are thus not directly consistent with data as shown in the paper.

* National Audit Office "Department of Transport : Bus Fuel Grants". HMSO, London, February 1989

PRW 24.4.89

Figure 3

,ocal services income: 1969–70 to 1986–7



\djusted for general inflation to 1986–87 prices, using the Retail Price Index

ource: Department of Transport