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FARE STRUCTURE FOR BUS STAGE SERVICES

by

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CONTENTS

FARE STRUCTURE FOR BUS STAGE SERVICES

ABSTRACT

With any bus undertaking, fare structure, level of fares and method of payment all interact to affect the amount of travel, the revenue received and the costs of operating the service provided.

A comparative analysis of a flat-fare and graduated-fare system, using London data (but ignoring possible interactions with the Underground railway) is described in the Report for three situations:

(i) where the introduction of flat fares results in no bus operating cost savings.

(ii) where flat fares result in an appreciable operating cost saving due to reductions in boarding times of one-man buses and an increase in the number of two-man buses which can be converted to one-man operation.

(iii) where the operating cost savings are as specified in (ii) and where the number of buses in service is changed in proportion to the number of passenger journeys made.

The results suggest that, if the undertaking is required to break-even, the economic case for flat fares is weak, unless such a system can bring about substantial operating cost savings. If, however, transport policy favours cheap subsidised travel, then there is a case for flat fares which becomes stronger with increasing operating cost savings and with increasing subsidies.

Aspects of fares policies such as passenger convenience in using the system, equity and fairness, and the ease with which management information can be obtained are also relevant and are discussed qualitatively.

1. INTRODUCTION

The system of fares adopted by a public transport undertaking has wide ramifications. The general level of fares, the structure of the fare scale and the way in which fares are paid all interact to affect the following:

(i) amount of travel and the distribution of journey lengths

(ii) revenue received

(iii) operating costs, by virtue of
- (a) boarding and alighting times of one-man buses
- (b) ease of converting from 2-man to one-man operation* (this has repercussions on the ability to recruit and on lost mileage).

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* To be referred to as OMO in the remainder of this report.

(iv) passenger attitudes (convenience, fairness etc).

(v) ease with which management information can be made available.

Though there are many different types of fare systems in use, they fall essentially into two categories depending on whether they are distance-related (graduated fares) or not (flat fares). Distance-related fares vary from finely-graduated ones (typical of most British systems) to coarsely-graduated ones (including the zonal systems used fairly extensively in continental cities).

The method of payment, which depends very much on the type of bus in use and whether it is crew-operated or one-man operated, usually falls into one of the following categories:

2-man operated system: payment made to the conductor

1-man operated system:
- (a) fare paid to the driver or to a machine using cash or pre-paid tickets (single or multi-journey)
- (b) pass or season ticket shown to driver
- (c) combination of above

With a two-man bus, payment is made while the bus is in motion and therefore has no effect on bus travel time, whereas with a one-man bus the different methods of payment can have substantial effects on boarding times and therefore on the operational costs of the service.

2. THE EFFECTS OF DIFFERENT FARE SYSTEMS

The various interactions between fare levels, fare structure and methods of payment are summarised in Fig 1, which is reproduced from a paper by Quarmby to the TRRL Symposium on Public Transport Fare Structure[1]. The main interactions are described below in terms of their effects on patronage and revenue, operating costs, passenger attitudes and management information.

2.1 Patronage and revenue

Fare level and fare structure together affect passenger demand and consequently the amount of revenue received. Because people are willing to pay more for long journeys than short journeys, a finely-graduated system should attract more passengers than one with a fixed fare equal to the average fare paid with the graduated system. For the same reason, a finely-graduated system should maximise the amount of revenue collected for a given mean fare level. It is possible that the same revenue could be obtained if a very high flat fare were charged, but patronage would be expected to be substantially reduced; this aspect is considered in greater depth in section 3.

The use of season tickets which allow unlimited use of the entire system is even less price discriminating than flat fares, since the cost of travel is insensitive not only to the distance travelled but also to the number of trips made.

2.2 Operating costs

The fare structure and the method of payment together affect boarding times of one-man buses. In general, the simpler the system of fares and method of payment, the less time required for passengers to board and the fewer buses required to operate a given service. Observations of existing systems[2] have shown that flat fares can speed up this boarding process appreciably (see Table 1). Boarding times on OMO buses can be reduced still further if season tickets are used, either with a graduated or with a flat-fare system, and if the method of payment encourages two-stream boarding to take place, as for example when pre-paid tickets, purchased off the bus in shops or kiosks, are used in conjunction with a cancelling machine on the bus and when direct payment is made to a machine on the bus as an alternative to paying the driver.

Boarding time is also an important criterion in determining whether conversion from 2-man buses to OMO can take place and in some towns no further conversion to OMO is feasible with present fares systems and ticketing

procedures because the resulting boarding times would be so long that they would cause undue interference between buses at multi-route bus stops. The lower boarding times with flat fares, with or without the use of season and pre-paid tickets, may well allow most of the remaining two-man buses to be converted.

Thus, the reduced operating costs associated with a flat-fares system (with whatever method of payment is used) compared with a graduated system, arise from:

1. reduced boarding times of one-man buses
2. reduced crew costs of those two-man buses which can be converted under a flat-fare system, but which cannot under a graduated system.

The various methods of payment will have financial repercussions other than those on operating costs already mentioned. For example, the use of pre-paid tickets involves a loss of revenue if, as is usual, a discount on the normal price is allowed and if commission is paid to vendors of the tickets. Similarly, with season tickets, the price is usually set somewhat lower than the total value of journeys which the average user is likely to make. This loss of revenue does not arise with the pay-machine method, though the purchase price of the machine and the maintenance costs have a small effect on overall operating costs. Incidentally, the use of machines is not always easy and straightforward and some people, particularly strangers, may be deterred from travelling when no alternative to a machine-payment system is available.

2.3 Attitudes of passengers

Passengers expect to pay more for travelling further and any system which subsidises long-distance travellers at the expense of those making short trips might well be regarded as being both inequitable and regressive since the better-off sections of the community tend to live in the more outlying areas further from shops and workplaces and, hence, travel the longer distances*. A finely-graduated system is therefore seen by both public and operator to be fair and equitable. However, a graduated system involves a more complicated payment process, and is harder to understand, particularly by the stranger who may be unfamiliar with the fare structure, the method of payment and the local geography. Thus, there is a conflict between ease of operation and sense of fairness. One result of a flat-fare system is to distort the normal pattern of movement by encouraging long trips at the expense of short trips. The slogan 'hop on a bus' which has been a feature of many advertisements in recent years is portraying an idea which is incompatible with a flat-fares system unless the fare is set at a very low level. A fares system which includes the use of season tickets has a more complicated effect on passengers' attitudes, depending on the types of season ticket which are offered. If the season ticket is priced on a graduated basis (as on the railways), then the passenger will only purchase one if he feels that he will save money, taking into account the journeys he may make which he would otherwise not make. It would appear that passengers have no strong feelings either for or against this type of season ticket on equity grounds, but the use of flat-fare season tickets could produce stronger feelings, because the same price is paid by those who make a few short trips as by those who make a large number of long trips (though the former category of people would normally have the option of paying separately for individual journeys if this were likely to result in a lower total cost); any inequity becomes more pronounced when such tickets are priced at a very low level. Perhaps the worst system from this point of view is the flat-rate season ticket with no alternative method available for paying for individual journeys. If the season ticket is priced at a high level, those previously making a few short trips either find themselves paying exorbitant prices for their travel, so subsidising those making many long trips, or they refrain from using the system. If it is priced at a low level substantial subsidies are required, in which case the taxpayer or rate-payer is effectively subsidising those who make a large number of long trips.

2.4 Management information

Statistical information, such as the distribution of journey lengths, is of considerable use to management

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* Whether this pattern of trips would remain unchanged under a flat-fare system is debatable; it is conceivable that such a system might have a marked effect over a long period of time in redistributing population.

in planning bus operations, and the ease of collecting such data is affected by the type of fare system in use. A graduated-fare system, with tickets issued for each journey made, greatly facilitates the collection of data of this type, much of which can be obtained simply from an analysis of the sale of tickets. This is independent of whether buses are two-man or one-man types, though with the latter the graduated system may well have been coarsened in order to simplify fare collection; if so, the data would be less useful. Automatic collection of data is now possible with some mechanised methods of fare collection. A high usage of season tickets and concessionary fares (low-priced tickets for special groups of people such as children, students, old-age pensioners) can reduce the reliability of the information produced from an analysis of ticket sales, even when a finely-graduated system is in use. With a flat-fares system, any information obtained from ticket sales is of limited use and managements usually have to resort to special surveys to obtain the information essential to the efficient running of their undertakings.

3. ECONOMIC ASPECTS OF FLAT AND GRADUATED FARES

The effect of the two systems on revenue, operating costs and patronage is investigated in this section of the paper with reference to the situation in central London where a graduated-fare system is in operation. London data were used because of their ready availability though it is fully realised that the introduction of flat fares on London Transport buses, while retaining a graduated-fares system on the Underground railway, could have undesirable repercussions on the modal split by encouraging the longer trips to be made by bus and the shorter trips by Underground (which, because of its high access time, is more suited to the longer journeys). If the same fares system were to be applied to both buses and Underground (or at least to that portion of the Underground which is in direct competition with the buses), then this problem would disappear but the problem of the interaction between Underground and British Rail services would take its place. However, since most cities do not have an Underground system or any other competing public transport mode, an analysis of the type described in this report is clearly relevant, even though based on London data. It is not claimed that the results obtained will apply without qualification to other cities, but it is felt that they will provide useful pointers to the merits or otherwise of flat-fare systems; obviously, before implementation of any new fare system, detailed studies should be carried out using data which is both appropriate and up-to-date.

In 1972, the distribution of normal adult fares paid on London buses, according to the Annual Report and Accounts of London Transport[3], was as shown in Fig 2; the mean fare paid was about 5½ pence. It is noteworthy that 70 per cent of all fares paid were less than the mean level. If a flat-fare system were to be introduced with the fare level roughly at the mean of the original graduated system, a large number of passengers would suffer considerable increases (in percentage terms) in fares whilst some would receive substantial subsidies. Calculations have been made of the changes in patronage and in profitability* of the undertaking which would be likely to occur if the graduated system were replaced by a flat-fare system with fares equal to varying proportions of the mean graduated-fare level. The patronage figures were estimated by assuming that for each group of travellers in the five fares categories shown in Fig 2 the numbers would increase or decrease in accordance with an assumed fares elasticity of −0.3 ie if a flat fare of 5p were chosen those travellers previously paying 3p would suffer a fares increase of 67 per cent and, with a fares elasticity of −0.3, twenty per cent would cease to travel**. Repeating this process for the different fare groups and summing over all groups gives the expected overall patronage figures, and hence revenue figures, for each value of flat fare selected.

It seems plausible that short trips (particularly, the 'hop on a bus' type) would be more elastic than long trips but, as yet, there is no published evidence for this. However, it is understood from London Transport that their latest measurements do give some indication that there may be a fall-off in elasticity with increasing journey length. Though most of the calculations in this paper were based on constant elasticity, some calculations have been made under a variable-elasticity assumption.

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* Profit is defined as revenue less operating costs. For simplicity and ease of explanation, it has been assumed in these calculations that the original graduated-fares situation is a break-even one in which revenue exactly balances operating cost. There is no difficulty in making the calculations for situations where this is not so, but the results would be less general and the explanation unnecessarily complicated.

** This method of estimating changes in patronage is simple and convenient, but is strictly only satisfactory when the changes in fares are small. More sophisticated methods[4] are required when changes are large or when fares tend to zero, but checks using these more complicated procedures revealed only minor differences in the results.

3.1 Comparison of the two systems: constant operating costs

In the first set of calculations, it is assumed that there is no change in operating costs as a result of the introduction of flat fares. Fig 3 shows the results of these calculations, where it can be seen from the upper graph that for very low flat fares, say half the present mean level, some extra passengers would be attracted but revenue would be reduced by nearly 50 per cent, resulting in a 50 per cent deficit. When the flat fare reaches 80 per cent of the present mean fare level the same overall patronage could be expected though the distribution of journey lengths would be different (there would be fewer short journeys and more long journeys giving rise to about 10 per cent more passenger-kilometres), but revenue would be 20 per cent lower. As the flat fare is increased to the mean value of the original graduated system, patronage and revenue would both be less (by about 10 per cent) than the corresponding values with the graduated system, though the number of passenger-kilometres would be practically unchanged.

With a flat fare of more than about 15 per cent over the mean graduated level, revenue would actually be greater than it was originally, but patronage would be seriously affected. Thus, at low flat fares, the gain in patronage is at the cost of a serious loss of revenue and at high flat fares any gain in revenue is small compared with the loss of patronage. The lower diagram in Fig 3 indicates that a graduated-fare system, under conditions in which operating costs are independent of the fare system in use, would always give higher patronage than a flat-fare system for a given level of profitability. However, the difference in patronage diminishes as the fare is reduced so that flat fares may well be thought to be worthwhile if a cheap fares policy were to be adopted because of the extra convenience which this method offers, even when no operating cost saving is possible. If instead of patronage, passenger-kilometres had been plotted in Fig 3(b), the two curves would have been similar. It can be shown that if

(a) fares paid under a graduated system are directly proportional to the distance travelled, and

(b) elasticity is constant over the whole range of fares,

then a flat-fare system will attract exactly the same number of passenger-kilometres as a graduated system when the flat fare is equal to the mean fare of the graduated system, though the number of journeys and hence the revenue will be lower. This result is independent of the distribution of passengers within the various fares groups and whether the fares are break-even or not.

The merits of the two fares systems depend very much, therefore, on whether the number of journeys or the number of passenger-kilometres is regarded as the criterion of success: there are points in favour of both measures and simple considerations of economic benefit have suggested that a gain in passenger-kilometres roughly compensates for a fall of the same magnitude in passenger journeys, at least in the cases considered. Thus, an 'effective patronage' curve (taking into account the benefits of extra passenger-kilometres) could be drawn in Fig 3 (a) roughly midway between the actual patronage curve and the passenger-kilometres curve.

If elasticity is variable with respect to journey length, patronage levels will be affected. If, for example, the elasticity falls by half from the lowest fare groups on the graduated system to the highest group (but retaining the same overall mean elasticity as before) then both passenger journeys and passenger-kilometres under a flat-fare system will be reduced by 2 to 3 per cent compared with the constant elasticity situation. Thus, results using a variable elasticity and benefits based on a combination of passenger journeys and passenger-kilometres lead to much the same conclusions as using constant elasticity and benefits based on passenger trips.

For simplicity, therefore, patronage figures (and not passenger-kilometres) based on constant elasticity calculations will be used in the remainder of this paper as an indicator of merit for a given level of profitability.

3.2 Comparison of the two systems: lower operating costs with flat fares

Since it is most unlikely that flat fares would fail to increase both the convenience and speed of boarding and hence facilitate conversion to OMO, the calculations in this section will be made on the assumption that savings in operating costs with a flat-fares system are possible.

The gains to be expected from OMO conversion in central London (based on Quarmby's work[1]) are summarised in Table 1.

TABLE 1

Comparison of OMO and two-man systems

		Two-man operation	One-man operation		
			graduated	flat	free
Little use of season ticket and of second stream for boarding	Average stopped time (seconds)	8	17	12½	8
	Operating costs as per cent of two-man operation*	100	79	75	71
Half passengers use season tickets or second stream	Average stopped time (seconds)	8	15½	11	8
	Operating costs as per cent of two-man operation*	100	78	74	71

* This includes the cost of extra buses needed to restore the service to its original frequency as a result of longer boarding and alighting times, but does not include any lost revenue from passengers who decide not to travel because of the longer in-vehicle times (due to longer stopped times).

The lower operating costs with OMO, shown in Table 1, suggest that it would be economically sound to convert all two-man buses to one-man operation at some time in the future. The fact that some operators have decided not to do this implies that not all the relevant factors (not even all the relevant economic factors) were considered in the analysis which led to the results given in the above Table. It is certainly the case in London[1] that the longer boarding and alighting times consequent upon OMO conversion have caused considerable interference between buses at some bus stops on some bus routes and this has resulted in a substantial amount of extra delay and bunching. As a result, a halt (possibly temporary) has been called to the OMO conversion programme in London (now standing at just under the half-way point); it is understood that similar practical problems have also been encountered in the centres of one or two of the larger provincial cities.

With a flat-fares or free-fares system, these problems are less likely to arise and in the calculation now to be described it will be assumed that half the buses in the fleet under consideration are two-man operated and will need to remain so whilst a fully-graduated system of fares is in operation, but could be converted to OMO if a flat-fare system were to be introduced. Thus, for half the fleet, flat fares would enable a gain of 25 per cent in operating costs to be realised (100 units of cost down to 75) through conversion to OMO, while for the remaining half, already converted, the gain would be only 5 per cent (79 units of cost down to 75). The mean gain would be 16 per cent.

Changes in boarding and alighting times affect the attractiveness of the service and hence the patronage. The mean passenger boarding time in the 'before' situation (50 per cent OMO, graduated fares) is 8/2 + 17/2 = 12½s (from Table 1) which is the same as in the 'after' situation (100 per cent OMO, flat fares); thus, no correction is required in the estimated patronage figures due to changes in boarding and alighting times.

Changes in revenue resulting from the introduction of flat fares were estimated as described above and were combined with the sixteen per cent saving in operating costs to determine the true surplus or deficit. As before, it was assumed that the original situation was a break-even one. It was also assumed for this particular calculation that the number of buses in service remained constant for the different fare levels studied ie no more (or fewer) buses were brought into service when patronage increased (or decreased) compared with the number in use with the original graduated-fare system in operation. The upper graph in Fig 4 shows how

patronage and profitability are likely to change under a flat-fares system. It can be seen that the addition of the benefits from OMO conversion and from lower boarding and alighting times of present one-man buses make a flat-fare policy more justifiable on economic grounds. As before, at low flat fares the loss of revenue is high compared with the gain in patronage, but at relatively high flat fares the gain in revenue plus the OMO savings are comparable in percentage terms with the loss of patronage, and with a flat fare of just over 80 per cent of the mean graduated-fare level there is no deficit and patronage is approximately the same for the two systems. The extra passenger-kilometres together with the added convenience to the passenger could well sway a decision in this situation in favour of flat fares. The lower graph in Fig 4 shows the expected patronage with flat and graduated fares for the same level of profitability. From these curves it appears that there would be a clear case for a flat-fare system if revenue were not required to exceed 75 per cent of original costs, because of the higher patronage which would be obtained with flat fares for the same deficit.

3.3 Comparison of the two systems: lower operating costs with flat fares and variable bus provision

In the calculations reported in the previous two sections, it was assumed that the number of buses in service remained constant even though overall patronage varied with the level of flat-fare selected. In this section, the assumption is made that the number of buses in service varies with patronage to maintain roughly constant bus occupancy. Operating costs will therefore vary and will affect the overall deficit (or surplus); the changes in the bus flow will also affect waiting times and hence patronage. The upper graph in Fig 5 shows how patronage and profitability are likely to be affected under these conditions. The conclusions are similar to those obtained from Fig 4, where the number of buses did not vary.

When considering the possible options under a low-fares policy, it can be seen from the lower graph of Fig 5 that the point at which a flat-fare system gives higher patronage than a graduated-fares system for the same deficit is slightly higher than previously, at about 80 per cent of original costs. The case for flat fares is therefore slightly stronger when the number of buses brought into service is in proportion to the patronage.

4. CONCLUDING REMARKS

If the introduction of a flat-fare system were unlikely to produce any savings in operating costs, then the case for introducing such a system on purely economic grounds would be weak. If the flat fare selected were very low, the percentage increase in passengers would be small compared with the percentage loss of revenue: with a flat fare of half the mean graduated fare the cost to the undertaking of each additional passenger gained would be equal to about 8 times the new flat fare. If the flat fare were very high a small profit would be made at the expense of a large loss in patronage. There is no level of flat fare at which both patronage (or even passenger-kilometres) and profit would be higher with a flat-fare system than with a graduated system, and if elasticity falls with increasing journey distance, patronage would be a further 2 to 3 per cent lower still. Even so, however, if a policy favouring cheap fares were to be implemented the difference in patronage between a flat-fare and a graduated-fare system would be so small that other matters should become the deciding issues, in particular, passenger convenience, fairness and equity, the ease with which management information can be obtained and the effect of the fares system on the patronage of competing modes (in this case underground rail travel). With regard to these issues a flat-fare system is easy to understand and use (especially for strangers), while a graduated system makes the collection of useful data for management purposes particularly easy, and passengers (who are prepared to pay more to travel further) find the system fair and equitable. The introduction of flat fares on buses in London might induce the longer-distance traveller to transfer from rail to bus which could well lead to a less effective use of these two modes since rail, with its high access time and fast running speed, is more suitable for the longer trips, whereas buses are more suitable for the shorter trips.

If the introduction of a flat-fare system could result in reductions in operating costs of the order of 16 per cent (due to OMO conversions and reduced boarding times), then there would be no strong case against flat fares on economic grounds. With a flat fare of approximately 80 per cent of the original mean graduated-fare level, both patronage and the ability to break even would be practically the same as with the graduated system. Thus, in this case the added convenience of flat fares and the reduction in recruitment needs (because of OMO conversion) have to be weighed against the difficulty of obtaining management information, possible feelings of unfairness and the effect on rail travel. In a situation in which subsidies form at least one-quarter of the

original operating costs, then there would be a strong economic case for flat fares, since such a system would result in more passengers being carried for the same subsidy (assuming operating cost savings were at least 16 per cent); if passenger-kilometres were the criterion rather than passenger journeys, the savings in operating costs need only exceed about 10 per cent.

If, for either system, the number of buses in service is adjusted in proportion to the overall patronage levels, ie if a particular system results in 20 per cent more patronage, then 20 per cent more buses are brought into service, then the case for flat fares is increased; and in fact the calculations indicate that patronage is likely to be higher with a flat-fare system than with a graduated system for all levels of subsidy greater than about one-fifth of the original operating costs.

It should be noted that the results given in this paper were based on London data, mainly because of their ready availability, and, as mentioned earlier, possible effects on Underground rail patronage were not taken into consideration.

Calculations have not been made using data for other areas; it is possible that the differences in boarding times between a flat and a graduated fares system might be less in provincial cities than in London and, if so, the operating cost savings would be less and this would weaken the case for flat fares. The results in this paper may, however, provide a useful pointer to the likely effects of a flat-fare system, but detailed studies using local data would be required before any such system is implemented in practice.

The results obtained in this study are not incompatible with the general situation on the Continent, where flat-fare systems with widespread use of pre-paid and season tickets are commonplace, and where subsidies have been relatively high compared with those in this country.

5. ACKNOWLEDGEMENTS

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6. REFERENCES

1. QUARMBY, D. Paper 9 – Effect of alternative fares systems on operational efficiency: British Experience. Symposium on Public Transport Fare Structure: Papers and Discussion. *Department of the Environment, TRRL Supplementary Report SR 37UC.* Crowthorne 1974 (Transport and Road Research Laboratory).

2. WATTS, P F. Passenger handling performance of one-man buses. *Department of the Environment. TRRL Supplementary Report SR 114UC.* Crowthorne 1974 (Transport and Road Research Laboratory).

3. LONDON TRANSPORT BOARD. Annual Report and Accounts 1972. 55 Broadway, London.

4. SMITH M G and P T McINTOSH. Paper 3 – Fares elasticity: interpretation and estimation. Symposium on Public Transport Fare Structure: Papers and Discussion *Department of the Environment. TRRL Supplementary Report SR 37UC.* Crowthorne 1974 (Transport and Road Research Laboratory).

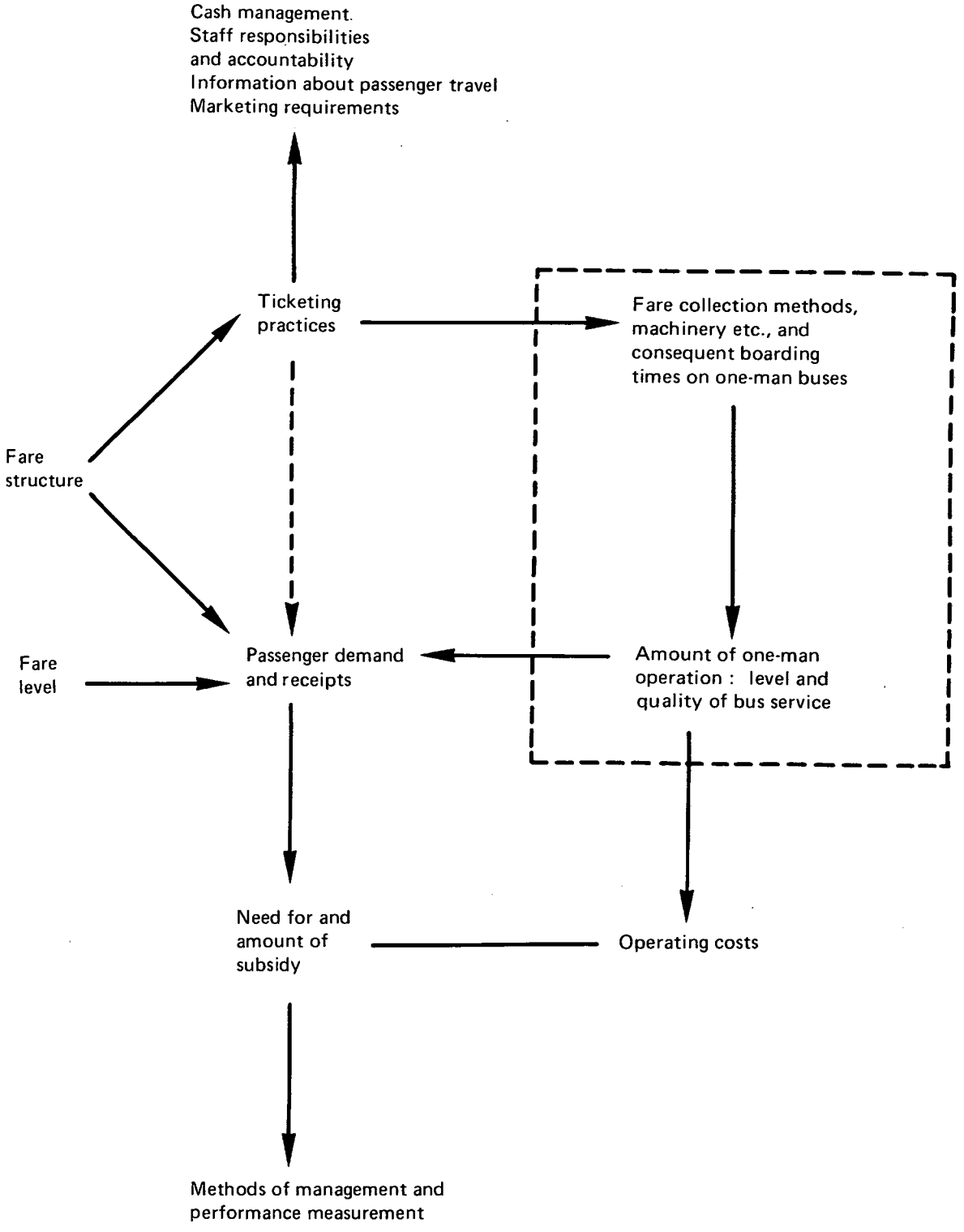


Fig. 1 IMPACT OF FARE STRUCTURE ON SOME OF THE PRINCIPAL PARAMETERS OF A BUS UNDERTAKING

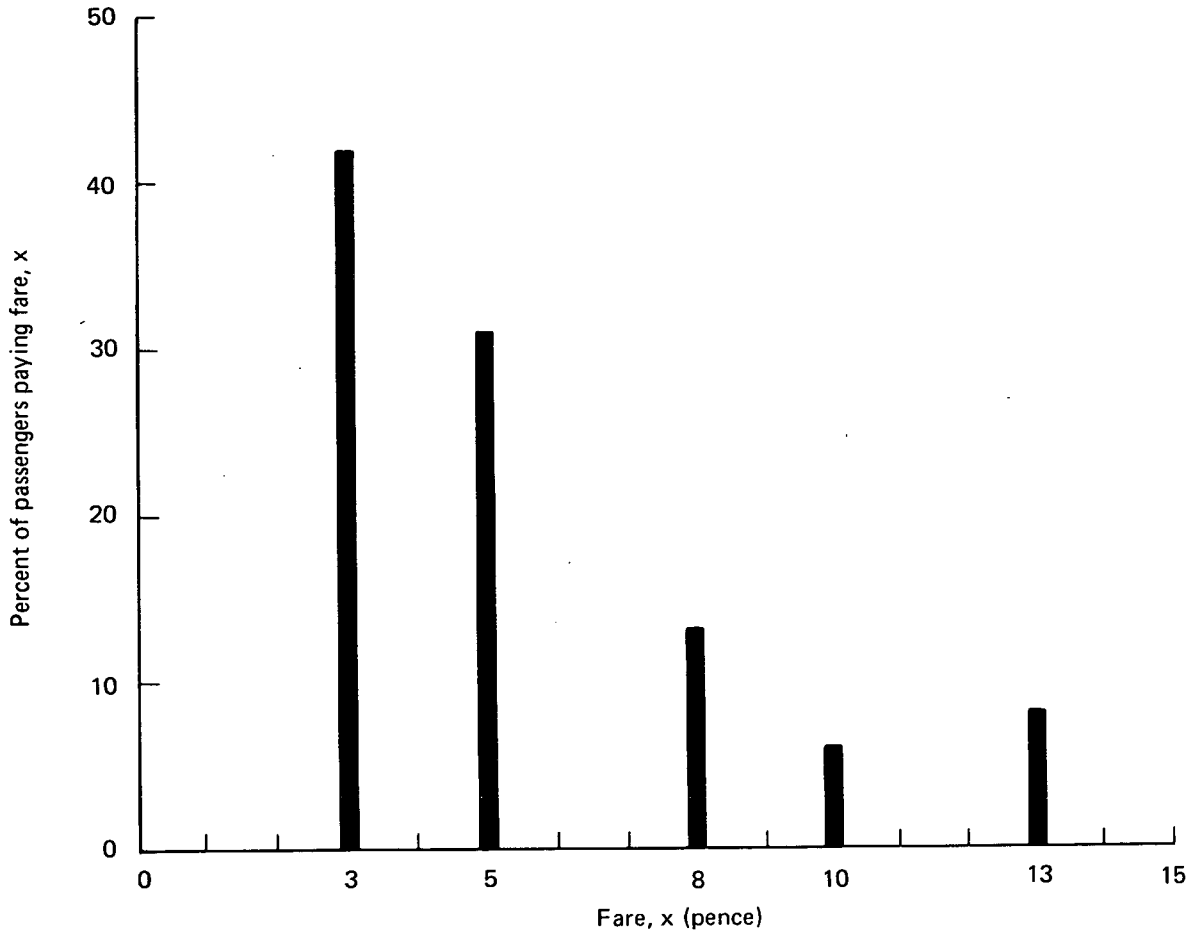
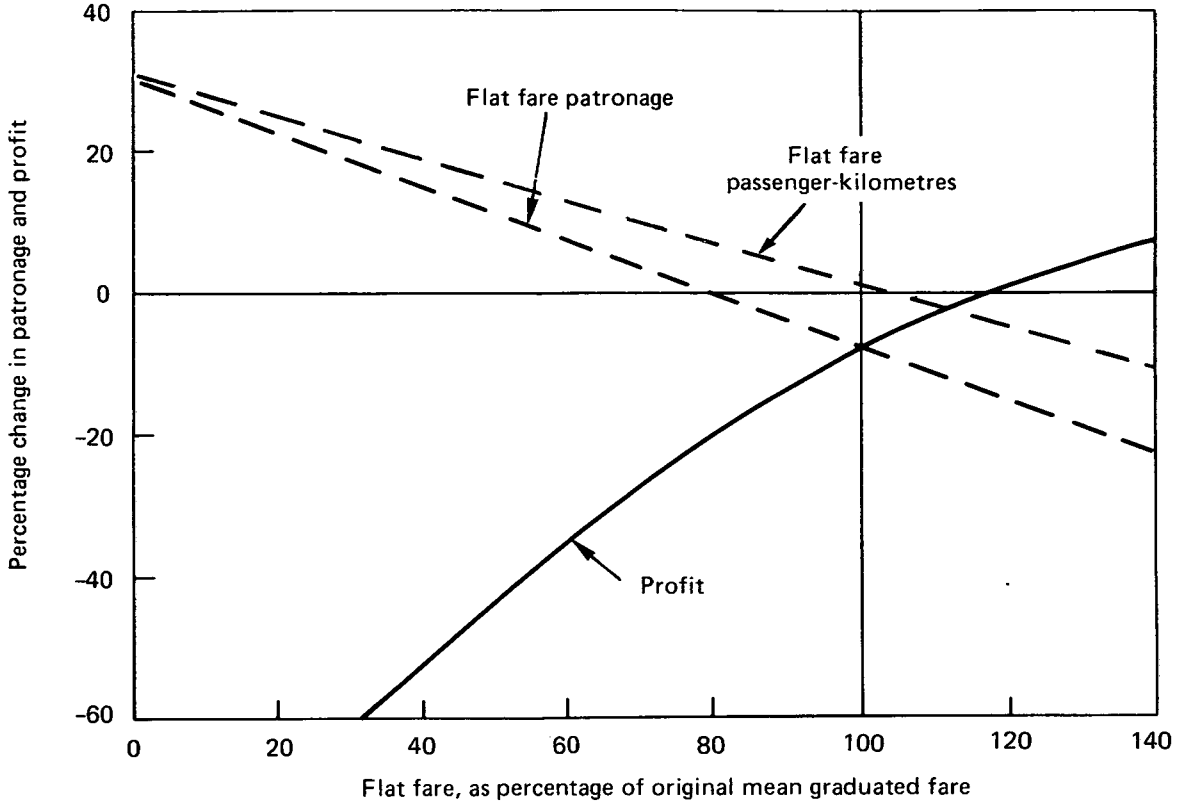
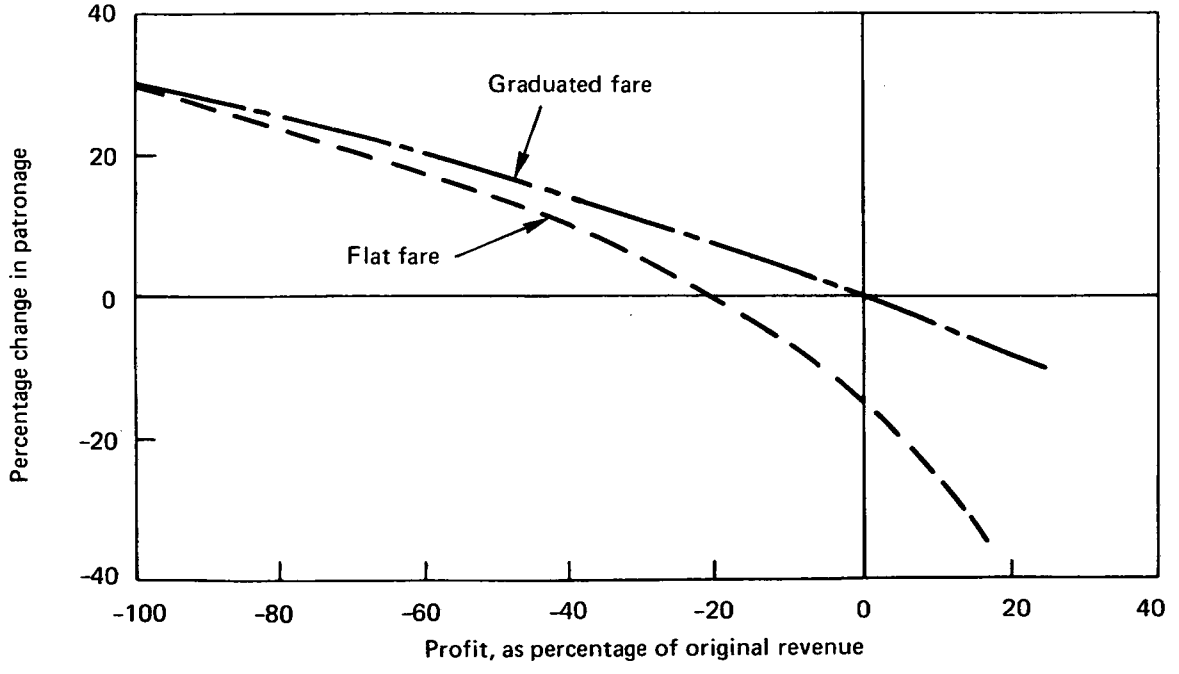


Fig. 2 DISTRIBUTION OF FARES PAID (LONDON, 1972)

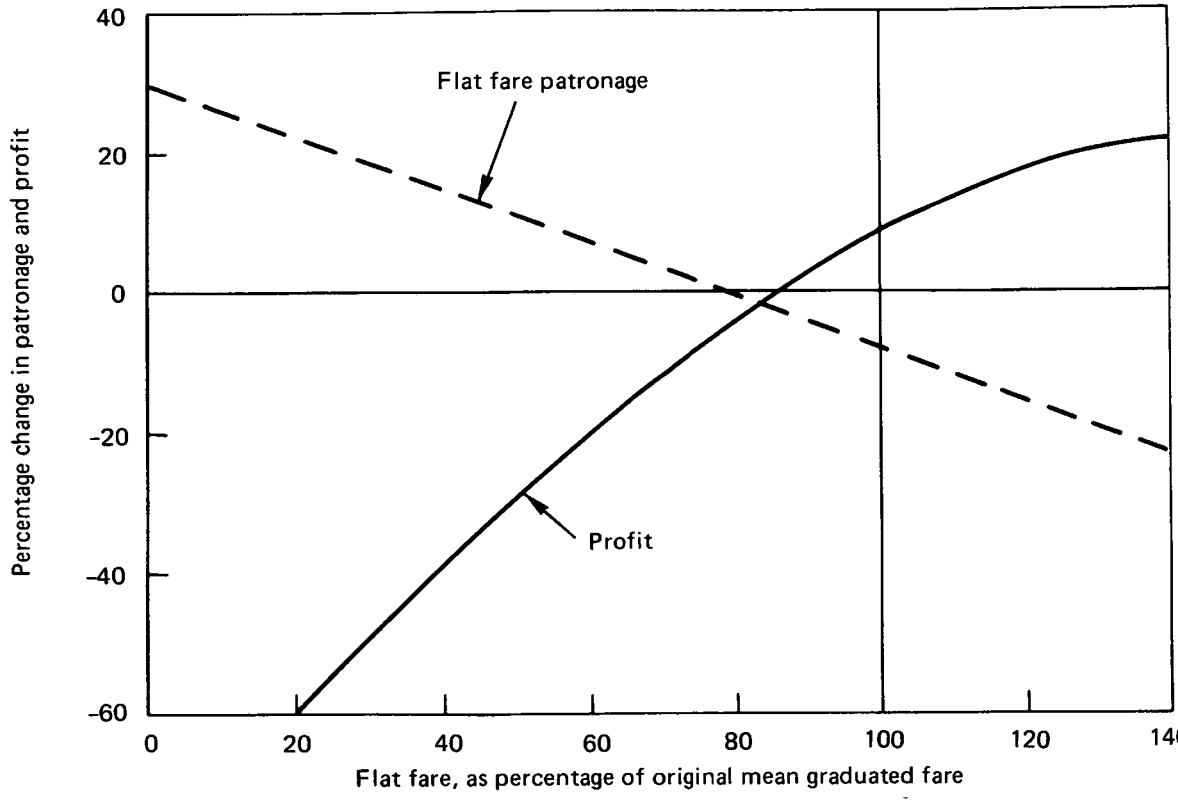


(a) Changes in patronage and profit for different levels of flat fare

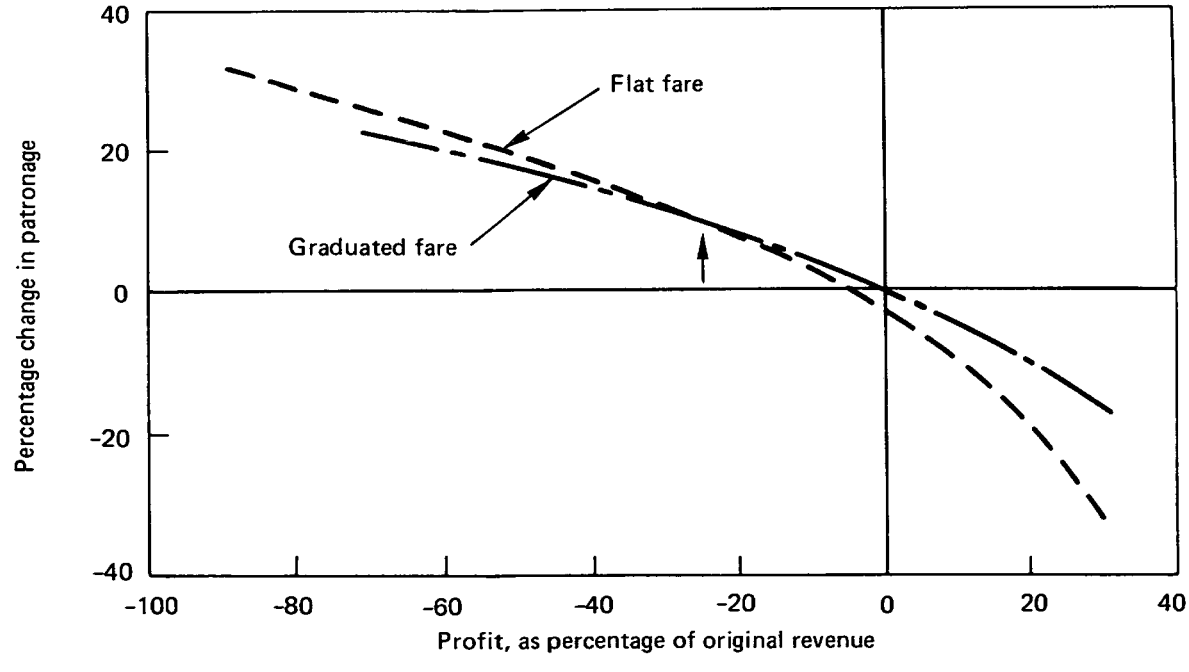


(b) Comparison of patronage for different levels of profitability

Fig. 3 COMPARISON OF A FLAT AND GRADUATED FARES SYSTEM (NO OPERATING COST SAVINGS WITH FLAT FARES, NUMBER OF BUSES IN SERVICE CONSTANT)

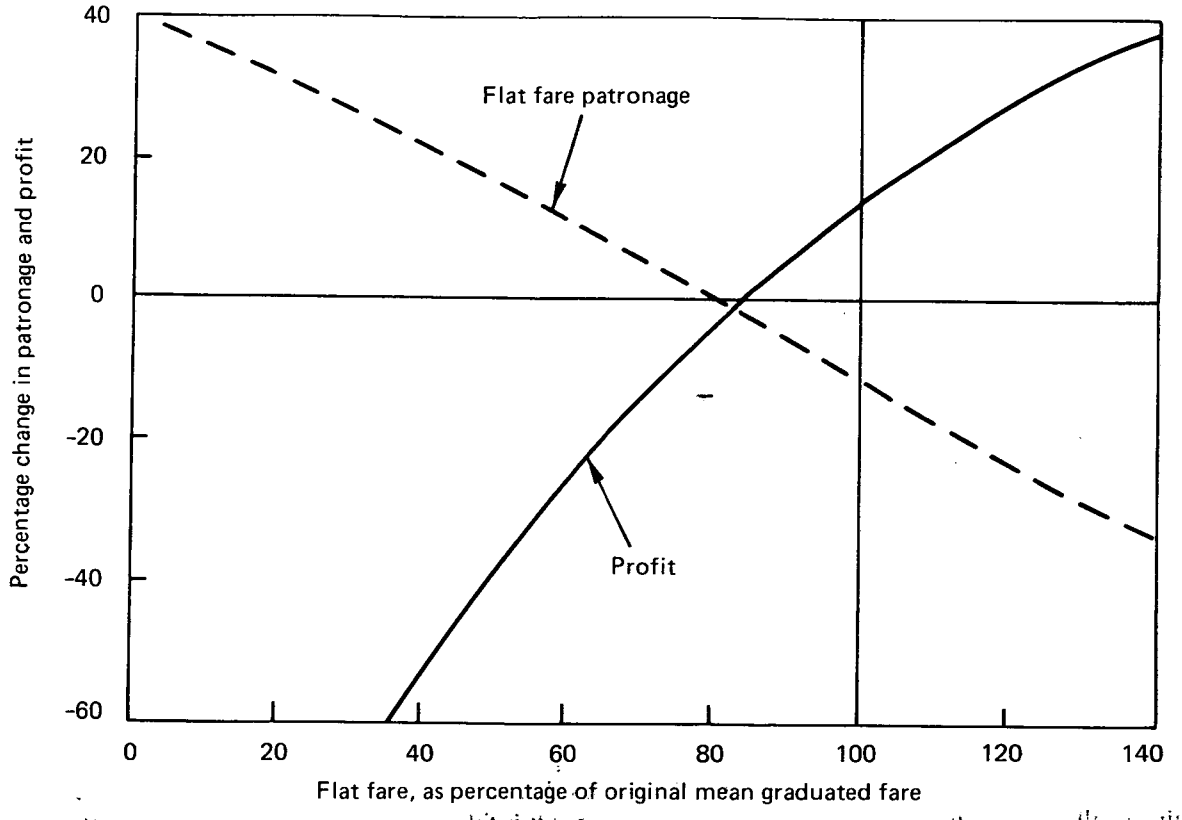


(a) Changes in patronage and profit for different levels of flat fare

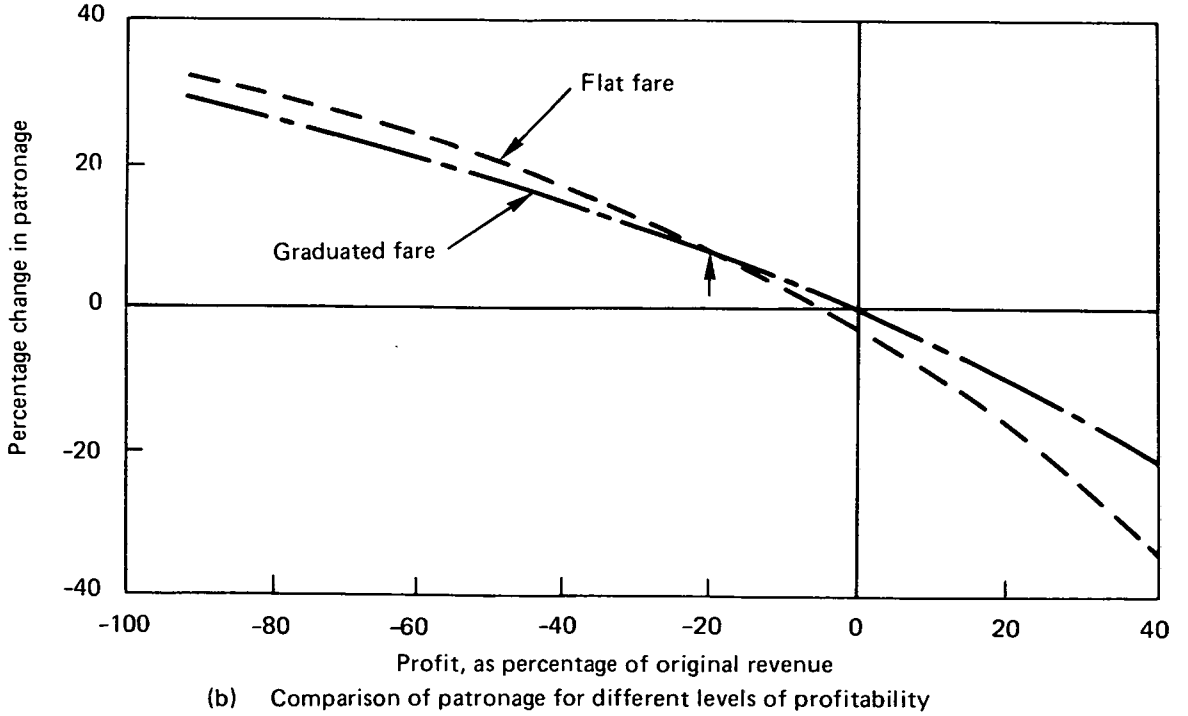


(b) Comparison of patronage for different levels of profitability

Fig. 4 COMPARISON OF A FLAT AND GRADUATED FARES SYSTEM (OPERATING COST SAVINGS WITH FLAT FARES, NUMBER OF BUSES IN SERVICE CONSTANT)



(a) Changes in patronage and profit for different levels of flat fare



(b) Comparison of patronage for different levels of profitability

Fig. 5 COMPARISON OF A FLAT AND GRADUATED FARES SYSTEM (OPERATING COST SAVINGS WITH FLAT FARES, NUMBER OF BUSES ADJUSTED IN PROPORTION TO PATRONAGE)

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ABSTRACT

FARE STRUCTURE FOR BUS STAGE SERVICES: F V WEBSTER: Department of the Environment, TRRL Laboratory Report 704: Crowthorne, 1976 (Transport and Road Research Laboratory). With any bus undertaking, fare structure, level of fares and method of payment all interact to affect the amount of travel, the revenue received and the costs of operating the service provided.

A comparative analysis of a flat-fare and graduated-fare system, using London data (but ignoring possible interactions with the Underground railway) is described in the Report for three situations:

(i) where the introduction of flat fares results in no bus operating cost savings.

(ii) where flat fares result in an appreciable operating cost saving due to reductions in boarding times of one-man buses and an increase in the number of two-man buses which can be converted to one-man operation.

(iii) where the operating cost savings are as specified in (ii) and where the number of buses in service is changed in proportion to the number of passenger journeys made.

The results suggest that, if the undertaking is required to break-even, the economic case for flat fares is weak, unless such a system can bring about substantial operating cost savings. If, however, transport policy favours cheap subsidised travel, then there is a case for flat fares which becomes stronger with increasing operating cost savings and with increasing subsidies.

Aspects of fares policies such as passenger convenience in using the system, equity and fairness, and the ease with which management information can be obtained are also relevant and are discussed qualitatively.

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