INTERPRETING LOCAL BUS COMPETITION IN BRITAIN

Andrew Evans
Professorial Fellow
The Flinders University of
    South Australia
SOUTH AUSTRALIA

ABSTRACT: *The prime feature of bus deregulation is that it
                   allows free entry for operators to any route. As a
                   consequence, commercial competition 'on the road' has
                   developed on some routes in Britain. This paper
                   presents one example of such competition, and
                   discusses a model for interpreting what happens. The
                   dominant effect so far of free entry has been to cause
                   operators to reduce costs, which benefits users or
                   subsidising authorities However, the model suggests
                   that deregulation may lead to higher-than-optimal
                   frequencies and fares. We also suggest that, in spite
                   of free entry, monopoly incumbents are able to adopt
                   strategies which exploit their monopolies to some
                   extent, while at the same time effectively deterring
                   entrants*

INTERPRETING LOCAL BUS COMPETITION

1.   INTRODUCTION

This paper discusses commercial competition in local bus services in
Britain 'on the road', following the Transport Act 1985. The Act allows
any bus operator to provide any local service at all, subject only to
registering details of the service with the Traffic Commissioners,
giving six weeks' notice of any changes, and meeting the usual safety
requirements. London is excluded. The paper is concerned with
interpreting 'on the road' competitive developments with a view
ultimately of considering whether uncontrolled free entry to local bus
services is desirable or not, although it is too soon to reach well-
based conclusions on this. The paper is part of a research project of
the author sponsored by the British Economic and Social Research Council
and Flinders University.

In the 20 months since deregulation was initiated, 'on the road'
competition in local bus services has not become the norm in Britain,
but it has developed in a substantial minority of places, which are now
so numerous that it would be impossible to list them all. The routes
and places of competition appear to be fairly representative of the
country generally: they include metropolitan areas, large towns, small
towns, and inter-urban routes, but not deep rural routes, where demand
is so low that there is no incentive to commercial competition.

The aims of the research project to which this paper relates are:

(1)   to document about 6-8 case-studies of commercial competition
       (making use as far as possible of data being collected by other
       bodies);

(2)   to interpret what happens in the light of micro-economic theory,
       particularly models relating to competition among small numbers
       of service providers;

(3)   to consider the implications of this for economic welfare.

At the time of writing, we have identified the case-studies, and
assembled most of the data about them that are available so far from the
public domain. Much work remains to be done to summarise these data,
and we await much information from other bodies. However, one case-
study, Hereford, is more advanced, because it was the site of
experimental deregulation from 1981, and the author has done previous
research in that area. This case-study provides data for our initial
interpetation of commercial competition.

Following this introduction, the paper continues as follows. In
Section 2 we present some basic public-domain data from the Hereford
case-study, in order to illustrate the kind of sequence of events that
can occur under commercial competition, and in order to demonstrate that

interpreting these events is a necessary task in forming judgements about deregulation. Section 3 considers economic models for interpreting deregulation, and is the core of the paper. Section 4 is the conclusion.

2.   AN EXAMPLE OF A CASE-STUDY: HEREFORD

In order to help fix ideas, it is helpful now to present some key data from our best-documented case-study so far: the city of Hereford (population 50,000). As mentioned above, Hereford is an exceptional and unique case-study, because it was the site of a so-called "trial area", where deregulation was introduced experimentally in October 1981, over six years ago. It was the only sizeable town to have experimental deregulation. Tables 1 and 2 give data on services and fares, which are the principal data in the public domain.

Table 1 shows the story of competition on the eight principal routes in the city of Hereford over the period since September 1981, just before deregulation, until February 1988. It gives the number of bus departures in a standard daytime hour on each route, operated by the major incumbent, Midland Red West, and by the 5 combined other private sector operators. (Midland Red West was in the public sector until December 1986, when it was privatised). A single figure against a route indicates that there was no competition on the route at the time; a pair of figures indicates that there was competition. Table 1 shows that before deregulation, there was no competition on any route, although one route was operated by a private sector operator. Subsequently, seven of the eight routes saw competition at some stage, with much increased frequencies. There were four competing private sector operators, generally each competing with Midland Red West, not with each other. From late 1984 competition began to slacken, and by April 1985 only one competitor to Midland Red West survived, operating on two routes. This operator was still surviving in February 1988. All routes had higher frequencies in February 1988 than they had had before deregulation. The story in the city is still not finished: in April 1988 Midland Red West introduced minibuses on most routes, thereby further increasing frequencies.

Table 2 gives fares on each route over the same period, together with a weighted average fare. The fares given are for Midland Red West, but the fares of competing operators on each route were generally the same or similar to Midland Red West's. Fares fell dramatically during the period of intense competition. They have subsequently gradually risen, although it was not until 1988 that the weighted average fare returned to its 1981 level in money terms, and it is still 25% down in real terms. Detailed comparison of Tables 1 and 2 shows that fares tended to be relatively low on competitively operated routes: the very low fares in November 1983 and 1984 applied only on the six then-competitive routes and not on the other two; the subsequent fare rise was less on the two still-competitive routes than on the others.

TABLE 1.   COMPETITION IN THE CITY OF HEREFORD: BUS FREQUENCIES ON PRINCIPAL ROUTES 1981-1988

Route	Length (Round trip) km	Operator	Buses per Hour in Standard Hour of Weekday Service									
			Sep 1981	Oct 1981	Apr 1983	Nov 1983	Jan 1984	Nov 1984	Apr 1985	Oct 1986	Apr 1987	Feb 1988
Credenhill	17.5	MRW*			2	2	2	3	3	3	3	3
		PS*	2	2		2	2	1				
Bobblestock	9.5	MRW	2	2	2	2	2	2	2	2	3	3
		PS		1								
Moor Farm	7.1	MRW	+	+	2	2	2	2	2	2	2	2
		PS										
Newton Farm	10.2	MRW	3	3	3	3	6	6	6	6	6	6
		PS				3	3	2				
Redhill	6.7	MRW	2	2	2	2	4	3	3	3	3	3
		PS			1	2	2					
Putson	7.4	MRW	2	2	2	2	3	3	3	3	3	3
		PS				1	1					
College Green	4.2	MRW	2	2	2	2	3	2	5	2	2	2
		PS				2	1	2	2	2	2	2
Hampton Park	10.4	MRW	3	2	2	2	4	4	5	2	2	6++
		PS			1	2	2	2	2	2	2	2

* MRW = Midland Red West; PS = private sector operators.
+ Moor Farm was served by midland Red West in combination with the Bobblestock Route in
    September and October 1981.
++ Combined frequency of buses on existing and new routes introduced in February 1988.
Source: Evans (1988).

TABLE 2. FARES IN THE CITY OF HEREFORD 1981-1988: MIDLAND RED WEST

Destination	Single Fare from City Centre to Given Destination (pence)									
	Sep 1981	Oct 1981	Apr 1983	Nov 1983	Jan 1984	Nov 1984	Apr 1985	Oct 1986	Apr 1987	Feb 1988
Credenhill	30	30	35	5	15	15	15	33	33	36
Bobblestock	20	20	25	25	25	25	25	27	27	30
Moor Farm	15	15	20	20	20	20	20	22	22	24
Newton Farm	32	32	34	10	15	18	18	33	33	36
Redhill	32	32	34	10	15	18	18	27	27	30
Putson	32	32	34	10	15	18	18	27	27	30
College Green	23	23	25	10	15	15	15	15	15	16
Hampton Park	34	34	37	10	15	15	15	20	20	22
Weighted Average (p)	28.3	28.3	31.3	11.8	16.4	17.7	17.7	25.9	25.9	28.4

Source: Evans (1988)

The purpose of presenting these tables is to illustrate the kind of sequences of events which can occur following deregulation, and the kind of data about them which may be obtained from the public domain, although Hereford's five-year headstart means that it will be some years before we have such long time series from elsewhere. The general task for interpreting competition is to explain and evaluate this kind of sequence of events. More specifically, we would like to account for the actions and apparent strategies of the operators, to estimate whether and by how much bus users have benefitted from competition, and to form a view about whether benefits are sustainable in the long run. It is clear that although data of the kind in Tables 1 and 2 are a representation of the major developments in services and fares, other data are also needed for interpreting the competition, much of which are not readily available, either because they are not recorded, or because they are not in the public domain. These further data include operating costs and the operators' financial outcomes, and bus patronage. In Hereford, only scraps of these other data were available, and we were therefore forced into considerable estimation and guesswork.

It is clear also that, whatever data may be available, explaining and evaluating what happens requires theoretical models of some kind. The theoretical models and conclusions from them may be tested to some extent against data, but they are always hypothetical and tentative, and they are always open to challenge. In the next section we consider micro-economic models of competition, although these are not the only way in which competition could be explained.

We now leave the Hereford case-study. It has served its purpose here by providing an example of local bus competition in practice, and by illustrating the task of interpretation. For those interested, the author has written elsewhere a fuller account of this case-study, together with an interpretation of what happened, using some of the ideas discussed in the next section; this account will be published later this year (Evans, 1988).

3.   ECONOMIC MODELS OF BUS DEREGULATION

Introduction

The prime feature of bus deregulation is that it allows any operator to operate on any route. Incumbent operators have to live with the perpetual threat of new entrants coming onto their routes or territory, and all operators have to decide whether or not to enter routes in competition with others. It seems reasonable to suppose that operators' decisions to enter routes will turn on whether entry appears to be profitable in the long run, if not in the short run. That in turn depends on what might be expected to happen on competitive routes. Therefore a reasonable starting point for the interpretation of bus deregulation is to consider economic models of competitively-operated routes. These models may then form a basis for considering circumstances in which entry is promising for new operators. From the

point of view of incumbents, we can also consider whether entry-
deterring strategies are possible, and, if so, whether they are
worthwhile. We can also consider the benefits to users from all this.
That is the agenda for this section.

Economic Models of Bus Competition

The debate leading to the Transport Act 1985 did not present well-
developed models of bus competition, although it did stimulate some
subsequent work. The White Paper preceding the Transport Act
(Department of Transport, 1984) had rather little discussion on bus
competition, and the main form of competition it considered was between
minibuses and conventional buses, or 'big buses', on high-demand routes
on the basis of simulations by Glaister (1985), rather than the
currently more common form of competition between similar buses. The
government considered that the local bus market was highly contestable
in the technical sense; this would mean that deregulation would
generally work to the benefit of users, irrespective of the details of
the competitive process. We discuss contestability in the following
sub-section. The debate following the White Paper before deregulation
again did not consider the competitive process in detail, although it
did include a good airing of the more general issues (Gwilliam et al,
1985; Beesley and Glaister, 1985). Following deregulation, Dodgson and
Katsoulacos (1988) have reviewed economic models related to bus
competition, and presented their own analytical model of minibus/big bus
competition. Evans (1987) presented a model of competition between
similar types of buses, which formed the starting point for the present
project.

In Evans (1987) we consider a model of competition on a single route.
We assume first that all operators have the same kind of equipment and
the same operating costs. Secondly, we assume that each competing
operator acquiesces in the presence of the other(s) and maximises his or
her own profit, taking the decisions of the other operator(s) as
given. Thirdly, we assume that, if fares on competing buses were equal,
passengers would choose to travel on that bus whose departure time was
closest to the time at which they wished to travel. If fares are not
equal, then passengers trade off fare savings against time shifts using
a common value of 'rescheduling time', similar to waiting time in other
models. We assume that passengers are indifferent between travelling
earlier and later than the time they prefer. With these assumptions we
show that it is possible to have a stable equilibrium pattern of
competitive services in which the departure times of buses are evenly
spaced and fares on all buses are equal. However, the frequencies are
somewhat higher than the best possible planned service, and the fares
are somewhat higher to pay for them.

We must stress that this outcome depends critically on the
assumptions. Other assumptions within the same framework would lead to
different outcomes. In particular, if operators do not acquiesce in
each other's presence, but adopt mutual loss-making fighting strategies

in order to try to knock each other out, then there may be no
equilibrium. (Military metaphors seem inescapable in this field). If
passengers choose their bus without knowing the timetable by waiting at
the bus stop until the first bus comes, then again there may be no
equilibrium, because operators will perpetually want to reschedule their
services just ahead of their competitors'. There are examples in
practice both of 'headrunning' and of equal-interval competitive
services.

An important idea from the main model is the idea of the 'competitive
equilibrium frequency' on a route. This is the maximum combined
frequency which can be provided on a competitively-operated route such
that all operators break even. Any increase in frequency above this
will lead to loss-making by some or all operators. The competitive
equilibrium frequency depends on operating costs and on the level of
demand; as mentioned previously it is higher than the welfare-maximising
frequency. A new entrant to a route is bound by definition to increase
its combined frequency. Therefore if a route already has the
competitive equilibrium frequency, an equal-cost new entrant is bound to
make a loss on the route initially. The only hope of making a profit in
the long run is to force the incumbent to withdraw or reduce frequency,
and this will almost certainly involve a loss-making fight. By
contrast, routes which initially have less than the competitive
equilibrium frequency may be entered profitably without forcing the
incumbent to withdraw, although entry will generally force timetable and
fare changes on the incumbent. The conclusion is that routes offering
less than the competitive equilibrium frequency are relatively
attractive for entrants. Correspondingly, the obvious defensive
strategy for a monopoly incumbent is to provide the competitive
equilibrium frequency herself or himself, thereby making the route
unattractive to entrants. Either way, we can expect commercial
frequencies to tend to rise following deregulation, as happened in
Hereford (Table 1). One interpretation of the widespread use of
minibuses in Britain following deregulation is that they are a means of
providing defensive high frequency services on moderate-demand routes
relatively cheaply.

Contestability and Entry Deterrence

As mentioned previously, in the debate leading to deregulation, the
Government considered the bus market to be highly contestable in the
technical sense, which means that the threat of entry by other operators
would force even large monopoly incumbents to act in their users'
interests. Contestability implies that if incumbents attempt to exploit
their monopoly position to extract excess profits from their users, they
will be undercut by entrants, if necessary on a hit-and-run basis.
Potential competition therefore forces incumbents to 'behave well'. The
author does not accept the contention that the local buy market is
contestable, although he does accept that potential competition plays an
important role in the deregulated market, and makes the market entirely
different from a protected monopoly.

There are both theoretical and empirical objections to accepting the contestability of the local bus market. As Dodgson and Katsoulacos (1988) and Vickers (1985) outline, the theoretical requirements for contestability are

(a)   that there are no sunk costs; and

(b)   that an entrant can begin operation before the incumbent(s) can respond by changing fares.

The critical requirement here is (b). It is obviously not met. The Transport Act 1985 requires that operators give six weeks' notice of service changes but need give no notice of fare changes, so incumbents have ample time to respond to entrants by changing fares. Even if the law were different, it is difficult to see how (b) could hold. Requirement (a) is less clear cut. Sunk costs are those which are not recoverable if an entrant leaves the market. The Government argued that sunk costs in the bus industry were near zero, because the main fixed cost is that of the buses, and this cost is recoverable when an entrant leaves a market, either by using the buses elsewhere or by selling them. The author accepts this, but notes that entrants still face some costs which are not recoverable. These include particularly the costs of researching, establishing, and publicising new services. These may be relatively small, but they are not negligible, and even small sunk costs can radically reduce the effectiveness of the threat of entry upon incumbents (Vickers, 1985).

An empirical test of contestability is that in contestable markets, fares should be the same on single-operator routes as on actively competitive routes. This was clearly not the case in Hereford (Tables 1 and 2). It is also not the case for long-distance bus services (Jaffer and Thompson, 1986), although that case is somewhat different, with other factors involved. The emerging evidence from the author's other case-studies is mixed. There are some cases similar to Hereford, but there are other cases where there is no difference between fares on competitive and single-operator routes. There are several cases where an area-wide pre-existing distance-related fare scale has been maintained even in the face of competition. It is difficult to see how such fare scales can survive deregulation in the long run, with or without active competition; we would expect fare scales to become route-specific, with lower fares on high-demand routes.

Several consequences follow from accepting that the local bus market is not contestable. First, operators are better off, and users are worse off, on monopoly-operator routes than on actively competitive routes. Monopoly operators have scope for earning excess profits at the expense of their users. In terms of the model discussed in the previous sub-section, a good strategy for monopoly operators is to provide the competitive equilibrium frequency (to deter entrants), but to charge

more than the competitive equilibrium fare (to make excess profits). If any entrant should then appear, fares can be reduced to the competitive level, so that the incumbent is not undercut.

On a more strategic level, all operators have an interest in retaining monopoly-operator routes. This can lead to tacit agreements to keep off each others' territory, and to mergers or takeovers to eliminate potential competition, a development which is just beginning to occur. It makes loss-making economic wars against entrants rational in a way that they would not be if the market were contestable. If there is a payoff from being a monopoly operator, then there is a payoff from knocking out the competition; moreover, the excess profits on other monopoly-operated routes can be used to build up a fighting fund for this purpose.

Most of this works to the disadvantage of the users. As previously mentioned, even the competitive fare/frequency combination is less beneficial for users than the optimal planned services (causing about a 10 percent loss in welfare (Evans, 1987)), and the exploitation of monopoly-operator routes makes this worse. The exception is that users tend to gain in the short run from economic wars, because losses to operators are effectively subsidies to users, although users have to put up with very unstable services during economic wars. Moreover, even with exploitation of monopoly-operator routes, users are better off with the resulting high fare/high frequency service than they would be with the high fare/low frequency service which would result from a monopoly with no threat of entry. Finally, the threat of entry puts pressure on operators' costs, and the benefits of reductions in costs are largely passed on to users. We discuss this in the next sub-section.

Operating Costs

The model described above is based on the assumption that operators have equal costs. If operators do not have equal costs, we can imagine that the threat of entry comes from a minimum cost operator, and that quantities such as the competitive equilibrium frequency are based on minimum cost operators. If incumbents do not have minimum costs, they are at a disadvantage relative to lower cost operators. At competitive equilibrium, they will make losses rather than break even, and in the long run must either reduce costs or be supplanted by minimum cost operators. When defending routes, incumbents must provide the competitive equilibrium frequency based on minimum costs to provide a defence against low cost operators; if their own costs are higher, they may make losses or less excess profits. Again, there is strong pressure on costs.

In practice, operators did not have equal costs before deregulation, although there was no agreement in the pre-deregulation debate about why costs varied. The government estimated that a 30% fall in the ex-public sector in operators' costs was possible. We do not yet have any comprehensive figures on post-deregulation costs, but it appears that many operators have indeed substantially reduced their costs. These

cost reductions have been passed on, mainly in the form of better services (in some places) or reduced subsidies (in others). These major and immediate effects have dominated most others so far.

4.   CONCLUSIONS

1.   The prime feature of deregulation is that it allows any operator to provide any service. Incumbent operators must live with the permanent threat of entry, and all operators have the possibility of competing on any route.

2.   In practice, active competition has developed only on a minority of routes in Britain, albeit a substantial and varied minority. Where it does occur, competition can lead to complicated and long drawn out sequences of service and fare changes.

3.   Theoretical models are needed to interpret and evaluate what happens after deregulation. These are required both to account for what happens in active competition, and also to explain why active competition has not developed in many places. Such models and explanations are always more or less tentative and open to challenge. We have presented one such model and its implications in this paper.

4.   The largest single effect of deregulation so far has been to cause the major operators to reduce costs. Cost reductions have occurred both in not actively competitive areas, where the threat of entry forces incumbents to reduce costs to be in a position to defend their routes, and in actively competitive areas. These cost reductions have benefitted users or subsidising authorities or both. They are the dominant effect in most pre- and post-deregulation comparisons.

5.   Other effects of deregulation are less beneficial to users. Our theoretical model suggests that it is likely to produce higher-than-optimal frequencies on commercial routes, either through active competition or as a result of defensive strategies by monopoly incumbents. Fares will also be too high.

6.   The issue of whether local bus services are contestable markets is important. We argue in this paper that they are not. Even with free-entry, monopoly incumbents can adopt strategies which give them excess profits at the expense of their users while at the same time effectively deterring entrants. This also gives operators an interest in retaining or acquiring monopolies, and eliminating competition by such means as tacit agreements, mergers and takeovers, or, if necessary, fighting entrants.

REFERENCES

Beesley, M.E. & S. Glaister (1985) "Deregulating the Bus Industry in Britain - a Response". Transport Reviews, Vol. 5, 133-142.

Department of Transport (1984), Buses. Cmnd. 8300, HMSO.

Dodgson J. & Y. Katsoulacos (1988) "Models of Competition and the Deregulation of Bus Services", in J.S. Dodgson and N. Topham (eds.), "Bus Deregulation and Privatisation: an International Perspective". Gower, Aldershot.

Evans, A. (1987) "A Theoretical Comparison of Competition and Other Economic Regimes for Bus Services", Journal of Transport Economics and Policy, Vol. 21, 7-36.

Evans, A. (1988) "Hereford: A Case-Study of Bus Deregulation", Journal of Transport Economics and Policy, Vol. 22 (forthcoming).

Glaister, S. (1985) "Competition on an Urban Bus Route", Journal of Transport Economics and Policy, Vol. 19.

Gwilliam, K.M., C.A. Nash & P.J. Mackie (1985) "Deregulating the Bus Industry in Britain - the Case Against". Transport Reviews, Vol. 5, 1985.

Jaffer, S.M. and D.J. Thompson (1986). "Deregulating Express Coaches: a Reassessment". Fiscal Studies, Vol. 7, 45-68.

Vickers, J. (1985) "Strategic Competition Among the Few - Some Recent Developments in the Economics of Industry". Oxford Review of Economic Policy, Vol. 1, No, 3, 39-62.