LOCAL BUS SERVICES MARKET INVESTIGATION

A summary of the main findings of the demand study

Summary

1. This paper summarizes the results of the demand analysis commissioned by the CC (the demand analysis).[1] The demand analysis uses econometric techniques to predict the demand for bus travel based on data on individuals' travel patterns from the National Travel Survey (NTS). The NTS is a detailed survey of travel behaviour of all types in Great Britain. Data relating to Greater London was excluded from the demand analysis.

2. The demand analysis describes demand for bus travel at the market level and as such can tell us about demand for bus services as a whole. The data does not allow an analysis of demand for bus services at the level of an individual firm, as this may be influenced by the possible presence of other bus operators. However, these results may provide a useful insight into the demand conditions facing bus operators that do not face competition from other suppliers of local bus services in their local area.

3. This analysis allows us to examine the travel decisions of a very large number of consumers, and thereby determine differences in the travel behaviour of groups of customers, what factors influence their behaviour, and in particular whether customers' decisions to use different methods of travel are influenced by changes in factors such as changes in bus fares relative to the costs of other modes of transport (and similarly, changes in service frequency and travel times or other factors). This is

[1] *A Disaggregate Analysis of Demand for Local Bus Service in Great Britain (excluding London) using the National Travel Survey*, J Molnar and L Nesheim, December 2010: www.competition-commission.org.uk/inquiries/ref2010/localbus/pdf/101213_demand_estimation_analysis_notification.pdf.

relevant to market definition[2] in that it gives us evidence where customers may have the option to use different modes of transport, whether they are in fact likely to switch between them in response to changes in fares or other factors, and so whether switching to alternative modes of travel represents a competitive constraint on local bus operators.

4. The demand analysis uses data on the travel choices of individuals within a one-week period. As such, the findings of this study provide information on relatively short-term demand responses. The demand study does not provide detailed information regarding longer-term demand responses.[3]

5. The main findings of the demand analysis study are:

   (a) The model predicts the responsiveness of demand for all individuals in the sample. The individuals in the sample display a range of elasticities with some individuals exhibiting a relatively high responsiveness of demand and many that exhibit a very low responsiveness to bus fares.[4]

   (b) However, what matters for bus companies, and their consequent behaviour, is the aggregate effect of price changes on demand from all individuals.[5] As there are very few responsive individuals, the aggregate demand for bus trips is un-responsive to bus fares. Higher fares will not induce many passengers to make fewer trips or to switch their method of transport to another alternative. The point is that although many customers will use alternative methods of travel, their choice is not strongly influenced by the level of bus fares. This tells us that other

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[2]We are also considering evidence from a variety of sources that is relevant to the question of market definition, eg survey evidence and observed behaviour by transport operators.
[3]These longer-term demand responses might include the purchase of a car, or changes in the individuals' home or work location.
[4]The elasticity of demand is a measure of the responsiveness of demand to a change in a particular factor such as prices or product quality. In this paper, we refer to the 'elasticity of demand with respect to bus fares'. This elasticity measures the proportionate change in demand for bus trips that would result from a proportionate change in bus fares. To give a practical example, if an increase in bus fares of 10 per cent were to result in a fall in the number of bus trips demanded of 5 per cent, then the elasticity of demand with respect to fares would be –0.5 (5%/10%).
[5]Firms cannot generally distinguish between price-sensitive and price-insensitive customers, although in some cases firms may be able to identify different groups of customers which tend to contain more price-responsive or unresponsive customers and charge different prices to each group (eg student-specific fares are sometimes offered).

forms of transport are a very weak constraint on bus operators' behaviour, at least with respect to fares.

(c) When the sample of individuals is split into different categories, the responsiveness of demand remains low for all groups of individuals. Although it is possible that individuals with more elastic (ie price-sensitive) demand are concentrated in a small number of geographic areas, the fact that no group we can identify within the sample exhibits elastic demand suggests that the definition of the relevant product market is unlikely to vary by local area, ie the conclusion in *(b)* is likely to be generally applicable.[6]

(d) The level of demand is very different between groups, and there are large differences in the propensity of different groups of individuals to travel by bus. Areas of high bus demand, per head of population, are likely to be areas with the following characteristics:

(i) car ownership is relatively low;

(ii) a high proportion of individuals live near to a bus stop;

(iii) a high proportion of individuals live near to a high-frequency bus service;

(iv) a high proportion of individuals in the area have a relatively low income;

(v) a high proportion of individuals are under the age of 15 or over the age of 60; and

(vi) the area is a larger urban or metropolitan area.

(e) In addition; individuals in the following areas tended also to display higher propensity for bus travel: the North-East, North-West & Merseyside, Yorkshire & Humberside and Scotland.

[6]Some methods of travel, such as the train or the tram, have fixed networks. As such, they may provide a viable alternative for some specific journeys, but because there are relatively few journeys for which bus and rail overlap the overall effect will be low. Further work would be necessary to determine whether there is a pattern between the elasticity of individuals with respect to bus fare and the relative availability of a rail or tram service.

The impact of bus fares and other factors on demand for bus services

6. The demand analysis predicts an elasticity of demand with respect to bus fares for every individual within the sample. Table 1 below shows the distribution of the predicted elasticity of bus demand for individuals, broken down into different journey purposes, for trips starting from home and for trips starting elsewhere. There is a similar pattern across all journey purposes. A small number of individuals have a predicted elasticity of demand for bus travel with respect to bus fares in excess of 1 in magnitude. However, the majority display much lower elasticities of demand. If we look at the average (mean) value of individuals' elasticities, these are very low. Only commuting trips starting from home display a mean elasticity greater than 1 in magnitude. This tells us that in general the majority of individuals are unresponsive to bus fares, in that a 10 per cent change in bus fares will result in a less than 10 per cent change in their demand for bus trips.

TABLE 1 **The distribution of individual's elasticity of demand with respect to bus fares**

Trip start point	*Trips from home*			*Trips from location other than home*			
Trip purpose	*Commuting*	*Shopping/ personal business*	*Other*	*Commuting*	*Shopping/ personal business*	*Other*	*Return home*
Percentile							
1%	–4.69	–2.54	–1.09	–3.77	–4.32	–2.25	–2.86
5%	–2.98	–1.59	–0.69	–2.02	–2.45	–1.34	–1.76
10%	–2.26	–1.22	–0.54	–1.39	–1.80	–1.01	–1.32
25%	–1.44	–0.76	–0.34	–0.70	–1.03	–0.61	–0.83
50%	–0.83	–0.44	–0.20	–0.24	–0.55	–0.34	–0.47
75%	–0.31	–0.15	–0.07	0	–0.18	–0.12	–0.18
90%	0	0	0	0.04	0	0	0
95%	0	0	0	0.08	0	0	0
99%	0	0	0	0.16	0	0	0
Mean	–1.04	–0.55	–0.25	–0.51	–0.78	–0.45	–0.60
Standard deviation	1.02	0.55	0.24	0.82	0.93	0.49	0.63

Source: A disaggregate Analysis of Demand for Local Bus Service in Great Britain (excluding London) using the National Travel Survey, L Nesheim and J Molnar, 2010, Tables C1 to C7.

7. This pattern of some customers being responsive and some unresponsive to changes in price is common in many markets. What is important from the perspective of the firm is the aggregate effect on demand for its services if it changes its own price. If we look at the elasticity of demand for bus travel across all individuals, the

model predicts an aggregate elasticity of –0.36. This is very low and in fact is so low that, in principle, it would imply that a hypothetical monopolist of bus services would be able to increase its profits by raising its prices. This is because a 10 per cent increase in price would lead to only a 3.6 per cent fall in demand.[7]

8. In many markets suppliers can identify different groups of individual customers and in some cases charge these different groups a different price. In the case of bus markets, bus companies charge different fares to different types of passenger (by age group), for different types of journey (singles, returns and season tickets) and for different geographic areas. It is therefore useful to look at the features of demand for bus travel for different groups of individual.

9. Tables D1 to D8 in the demand study summarize the findings with regard to the nature of bus demand from different groups of individuals. These tables are repeated below. It is important to draw out the distinction between the *elasticity* of bus demand from different subgroups and the *level* of demand from different subgroups.

10. The tables show that the *elasticity* of demand with respect to bus fares is low for all of the different subgroups of individual. This tells us that demand for bus travel from all groups of individual are relatively unresponsive to changes in bus fares. This in turn indicates that, regardless of the mix of individuals in a local area, a hypothetical monopolist of local bus services is likely, in principle, to find it profitable to raise prices.

[7]This can be illustrated with a simple example. Consider a hypothetical monopolist of bus travel selling 100 bus trips at a price of £1 per trip and a cost per trip of 50p. The hypothetical monopolist has total revenue of £100 and a total cost of £50, giving a total profit of £50. If the hypothetical monopolist now increases its fare by 10 per cent to £1.10, the model suggests that demand for bus trips would fall by 3.6 per cent to 96.4 trips. The hypothetical monopolist now has total revenue of £106.04p (96.4*£1.10). In addition to this, the hypothetical monopolist may also save some costs as a result of having to make fewer trips. The price rise is therefore clearly profitable.

11. However, there are large differences in the propensity of different groups of individual to make bus trips. So there may be large differences in the *level* of demand for bus travel in different local areas, because of the mix of individuals present in those areas. Some areas might have a high proportion of individuals that are more likely to travel by bus and so the number of bus trips demanded might be very high. These areas might be considered 'good bus territory'. In other areas the reverse may be true.

Demand for bus travel by time of day

12. Table 2 shows the profile of bus demand over the course of a day. The table shows that the elasticity of demand for bus travel is low at all times of day. The more common periods for individuals to travel during the day are 8am, 3pm and 5pm.

TABLE 2 **Demand for bus travel by time of day**

	Elasticity of demand with respect to bus fares	*Predicted share of all bus trips %*	*Number of individuals*	*Share of sample %*
Before 7:00	–0.39	3.6	319	2.8
7.00	–0.45	6.4	540	4.8
8.00	–0.46	9.5	1,140	10.1
9.00	–0.31	5.4	592	5.2
10.00	–0.32	5.8	619	5.5
11.00	–0.35	6.2	743	6.6
12.00	–0.36	6.8	740	6.5
13.00	–0.36	5.9	698	6.2
14.00	–0.35	7.3	737	6.5
15.00	–0.31	12.7	1,122	9.9
16.00	–0.33	7.3	895	7.9
17.00	–0.38	8.1	1,059	9.4
18.00	–0.42	5.0	734	6.5
19.00	–0.30	3.6	535	4.7
After 20:00	–0.34	6.4	827	7.3
Total		100.0	11,300	100.0

Source: A disaggregate Analysis of Demand for Local Bus Service in Great Britain (excluding London) using the National Travel Survey, L Nesheim and J Molnar, 2010, Table D1.

The effect of car ownership on demand for bus travel

13. Table 3 shows the effect of individuals' access to a car on demand for bus travel. The results of the demand analysis show that, regardless of whether individuals own a car or have a driving licence, in aggregate their demand for bus travel is relatively unresponsive to bus fares. However, there are large differences in the propensity of

individuals to travel by bus depending on their access to a car for their trip. The model predicts the share of all bus trips accounted for by individuals within each group. Table 3 shows that individuals with no car and no driving licence are predicted to account for 31.4 per cent of all bus trips. However, these individuals make up only 5.5 per cent of the sample of individuals in the NTS. Their propensity to travel by bus is therefore higher than average for the sample as a whole. We calculated a measure of the relative propensity to travel by bus by taking the predicted share of all bus trips and divided this by the share of sample accounted for by that group. Table 3 shows that individuals with a car and a driving licence are on average less likely than the population as a whole to take the bus. Perhaps unsurprisingly, the table shows that individuals without a car are considerably more likely (between four and six times) to travel by bus than the population as a whole.

TABLE 3 **Demand for bus travel by car access**

	Elasticity of demand with respect to bus fares	*Predicted share of all bus trips %*	*Number of individuals*	*Share of sample %*	*Propensity to travel by bus**
No car, not a driver	–0.34	31.4	632	5.5	5.7
No car, driver	–0.44	4.8	136	1.2	4.1
Have a car, not a driver	–0.37	37.7	2,523	22.0	1.7
Have a car, driver	–0.35	26.1	8,188	71.3	0.4
Total		100.0	11,479	100.0	1.0

Source: A disaggregate Analysis of Demand for Local Bus Service in Great Britain (excluding London) using the National Travel Survey, L Nesheim and J Molnar, 2010, Table D2.

*The propensity to travel by bus is calculated as the predicted share of all bus trips divided by the share of sample. This gives a relative measure of the propensity of individuals within each group to travel by bus.

14. So whilst car ownership can have a large impact on the level of demand for bus travel in a local area, and this may have a large impact on the profitability of bus operators, bus operators face only weak competition from the car. This is because, even though car ownership substantially affects the propensity to use buses (see Table 3), car ownership has little effect on the degree to which bus demand is affected by changes in bus fares (see elasticity of demand in Table 3) and consequently has little impact on the likely profitability of a price rise. In an area where every individual has a car, this analysis suggests that there will be fewer bus

users, but those users will still be unlikely to switch to their car, or make fewer trips, in response to an increase in bus fares.

The effect of the quality of the bus network on demand for bus travel

15. Tables 4 and 5 show how demand for bus travel is affected by two different aspects of the local bus network: *(a)* the density of the network and *(b)* the frequency of service offered. The tables show that individuals are more likely to travel by bus if they live near a bus stop and also if their local bus service is relatively frequent. More than 90 per cent of demand for bus trips is from individuals that live within 6 minutes' walk of a bus stop.

TABLE 4 **Demand for bus travel by walk time to bus stop**

	Elasticity of demand with respect to bus fares	*Predicted share of all bus trips %*	*Number of individuals*	*Share of sample %*	*Propensity to travel by bus**
<6 minutes	–0.36	91.4	9,421	85.3	1.1
7–13 minutes	–0.38	7.5	1,146	10.4	0.7
14–26 minutes	–0.37	1.0	322	2.9	0.3
27–43 minutes	–0.33	0.1	87	0.8	0.1
44 minutes or more	–0.55	0.1	74	0.7	0.1
Total		100.1	11,050	100.0	1.0

Source: A disaggregate Analysis of Demand for Local Bus Service in Great Britain (excluding London) using the National Travel Survey, L Nesheim and J Molnar, 2010, Table D3.

* The propensity to travel by bus is calculated as the predicted share of all bus trips divided by the share of sample. This gives a relative measure of the propensity of individuals within each group to travel by bus.

TABLE 5 **Demand for bus travel by frequency of local bus service**

	Elasticity of demand with respect to bus fares	*Predicted share of all bus trips %*	*Number of individuals*	*Share of sample %*	*Propensity to travel by bus**
<1 per day	–0.15	0.6	82	0.7	0.8
1 per day	–0.40	4.5	845	7.4	0.6
1 per hour	–0.37	15.5	2,753	24.0	0.6
1 per half hour	–0.38	35.7	4,350	37.9	0.9
1 per quarter hour	–0.34	43.7	3,449	30.0	1.5
Total		100.0	11,479	100.0	1.0

Source: A disaggregate Analysis of Demand for Local Bus Service in Great Britain (excluding London) using the National Travel Survey, L Nesheim and J Molnar, 2010, Table D4.

*The propensity to travel by bus is calculated as the predicted share of all bus trips divided by the share of sample. This gives a relative measure of the propensity of individuals within each group to travel by bus.

16. As with the other subgroups of individuals, all of these groups exhibit a relatively low elasticity of demand for bus travel with respect to bus fares.

Demand for bus travel from different types of individual

17. Tables 6 and 7 show how demand for bus travel varies for different types of individual. Table 6 shows that demand for bus travel is drawn from all income groups but that individuals from households with relatively low incomes are more likely than others to travel by bus.

TABLE 6 **Demand for bus travel by household income**

	Elasticity of demand with respect to bus fares	*Predicted share of all bus trips %*	*Number of individuals*	*Share of sample %*	*Propensity to travel by bus**
<£12,500	–0.39	23.7	1,416	12.3	1.9
£12,501–£20,000	–0.37	16.2	1,445	12.6	1.3
£20,001–£35,000	–0.36	23.7	2,910	25.4	0.9
£35,000–£50,000	–0.37	16.9	2,472	21.5	0.8
£50,000 or more	–0.32	19.5	3,236	28.2	0.7
Total		100.0	11,479	100.0	1.0

Source: A disaggregate Analysis of Demand for Local Bus Service in Great Britain (excluding London) using the National Travel Survey, L Nesheim and J Molnar, 2010, Table D5.

* The propensity to travel by bus is calculated as the predicted share of all bus trips divided by the share of sample. This gives a relative measure of the propensity of individuals within each group to travel by bus.

18. Table 7 shows, perhaps unsurprisingly, that individuals who are under the age of 15 and individuals who are older than the age of 60 are more likely to use the bus. Individuals between the ages of 15 and 59 are less likely to travel by bus.

TABLE 7 **Demand for bus travel by age of individual**

	Elasticity of demand with respect to bus fares	*Predicted share of all bus trips %*	*Number of individuals*	*Share of sample %*	*Propensity to travel by bus**
<15	–0.34	21.4	1,670	14.5	1.5
15–19	–0.36	7.2	983	8.6	0.8
20–59	–0.39	59.3	8,340	72.7	0.8
60 or older	–0.18	12.1	486	4.2	2.9
Total		100.0	11,479	100.0	1.0

Source: A disaggregate Analysis of Demand for Local Bus Service in Great Britain (excluding London) using the National Travel Survey, L Nesheim and J Molnar, 2010, Table D6.

*The propensity to travel by bus is calculated as the predicted share of all bus trips divided by the share of sample. This gives a relative measure of the propensity of individuals within each group to travel by bus.

19. Again the analysis shows that the responsiveness of demand for bus travel to bus fares, from all groups, is relatively low and in all cases less than 1 in magnitude.

The effect of geography on demand for bus travel

20. Table 8 shows how the type of settlement that individuals live in affects demand for bus travel. More than 78 per cent of demand for bus travel is from individuals living in settlements with a population of more than 25,000 people. Individuals living in larger settlements are also more likely to travel by bus. As the study found with other sub-groups of individuals, all groups display a relatively low elasticity of demand for bus travel with respect to bus fares.

TABLE 8 **Demand for bus travel by settlement size**

	Elasticity of demand with respect to bus fares	*Predicted share of all bus trips %*	*Number of individuals*	*Share of sample %*	*Propensity to travel by bus**
Metropolitan built up	–0.36	27.7	1,874	16.3	1.7
Urban 250k+	–0.34	22.7	1,869	16.3	1.4
Urban 25k–250k	–0.35	28.2	3,686	32.1	0.9
Urban 10k–25k	–0.45	7.1	1,154	10.1	0.7
Urban 3k–10k	–0.39	5.5	1,199	10.4	0.5
Rural	–0.39	8.9	1,697	14.8	0.6
Total		100.1	11,479	100.0	1.0

Source: A disaggregate Analysis of Demand for Local Bus Service in Great Britain (excluding London) using the National Travel Survey, L Nesheim and J Molnar, 2010, Table D8.

*The propensity to travel by bus is calculated as the predicted share of all bus trips divided by the share of sample. This gives a relative measure of the propensity of individuals within each group to travel by bus.

21. Table 9 shows how demand for bus travel varies by Government Office (GO) Region. The responsiveness of demand for bus travel to bus fares is low in all regions of England, Scotland and Wales. The propensity of individuals to travel by bus does vary between regions. Individuals are more likely to travel by bus in north-east England, the North-West & Merseyside, Yorkshire & Humberside and Scotland. Individuals who live in the South-East of England, South-West of England, East of England and East Midlands are less likely to travel by bus.

TABLE 9 **Demand for bus travel by GO region**

	Elasticity of demand with respect to bus fares	*Predicted share of all bus trips %*	*Number of individuals*	*Share of sample %*	*Propensity to travel by bus**
North-East	–0.39	7.6	645	5.6	1.4
NW & Merseyside	–0.34	18.0	1,656	14.4	1.2
Yorkshire & Humberside	–0.32	12.8	1,042	9.1	1.4
East Midlands	–0.31	6.6	1,034	9.0	0.7
West Midlands	–0.38	11.0	1,262	11.0	1.0
Eastern	–0.38	7.3	1,206	10.5	0.7
South–East	–0.41	10.7	1,580	13.8	0.8
South–West	–0.39	6.8	1,341	11.7	0.6
Wales	–0.47	5.7	677	5.9	1.0
Scotland	–0.31	13.4	1,036	9.0	1.5
Total		99.9	11,479	100.0	1.0

Source: *A disaggregate Analysis of Demand for Local Bus Service in Great Britain (excluding London) using the National Travel Survey*, L Nesheim and J Molnar, 2010, Table D7.

*The propensity to travel by bus is calculated as the predicted share of all bus trips divided by the share of sample. This gives a relative measure of the propensity of individuals within each group to travel by bus.