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RESULTS FROM AN ANALYSIS OF THE MODE CHOICE DECISIONS OF LONG DISTANCE BUSINESS TRAVELLERS

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Contents

Abstract

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Mode choice models for long distance business travellers have been calibrated, using data on actual choices, generally with the objective of deriving demand elasticities and values of time for use in forecasting. The most recent such work using UK data dates from 1971. The results presented in this paper provide a much needed update of this earlier work.

Mode choice models are estimated using data collected from two surveys of long distance business travellers. Two sets of choices are modelled; car versus rail and air versus rail, where one of the two modes was that used on a recent long distance business trip and the other was the traveller's best alternative mode for the trip. Most of these trips were between North East and South East England. The estimated values of time are found to be substantially larger than those obtained in past studies.

INTRODUCTION

Mode choice models for long distance business travellers have been calibrated using data on actual choices (i.e. revealed preference data), generally with the objective of deriving demand elasticity estimates for use in forecasting and policy analysis (University of Leeds (1971), University of Southampton (1971), Grayson (1981), Stopher and Prashker (1976) and Stephanedes et al (1984)). As the most recent work employing UK data is that of the University of Leeds (1971), there is clearly a need for more up to date results. This paper provides such results from the analysis of mode choice data collected from 2 samples of long distance business travellers (Fowkes, Johnson and Marks (1985)). With this data we have calibrated binary logit models for the choices of travel by car or rail and air or rail; where one of the two modes was used on a recent long distance business trip and the other was the traveller's best alternative mode for the trip.

The research reported in this paper forms part of a larger project, funded by the SERC, on Long Distance Business Travel. In the course of the project three surveys were undertaken, 2 of business travellers and one of organisations (Fowkes and Marks (1985), Fowkes, Johnson and Marks (1985)). The data used in this paper comes from the former two surveys.

Before presenting the results of our analysis, we discuss the interpretation of revealed preference data for business travellers (Section 1) and then examine the nature of the choices facing our samples of travellers (Section 2). The third section of the paper contains the estimation results. The paper concludes with a comparison of the value of time estimates obtained from these results, and values obtained elsewhere, using revealed preference data, and from our own project, using stated preference data.

1. INTERPRETATION OF REVEALED PREFERENCE DATA

The mode choices revealed by business travellers result from decisions made by both the travellers and their employers. The employer typically defines the set of modes the traveller is allowed to use, through a formal or informal travel policy, and then the traveller chooses the travel mode to be used on a particular business trip from within the permitted set. Though in some cases the travel policy may dictate the mode to be used (Marks (1986)). Considering, for simplicity, the binary choice situation in which the traveller uses mode A and mode B is the best alternative then one has either:

1) the traveller is permitted to use both modes and so estimated demand elasticities, values of time etc. reflect the traveller's preferences, which may or may not include some consideration of the consequences of the decision for the employer, or

2) the traveller must, according to the company travel policy, use a particular mode and so estimated demand elasticities, values of time etc. reflect the employer's preferences.

In our samples most, but not all, respondents (92% for the car versus rail choice and 78% for the air versus rail choice) were permitted to use the best alternative mode for their reported journey. Thus parameter estimates obtained from this data reflect a weighted average of employers' and employees' preferences regarding the amount of company money to be spent on time savings, with most of the weight on the employees' preferences. If these parameter estimates are to be used in forecasting (or policy analysis), it is important that the sample of business trips used in analysis is representative of the category of business trips for which forecasts are being constructed. For if this is not the case, the relative weights given to employees' and employers' preferences may be incorrect and hence forecasts may be misleading. For the same reason one must be fairly confident that business travel policies are not likely to become noticeably more/less restrictive over the forecast period.

To assess whether employees' and employers' preferences differed in our samples, we estimated models on the complete data sets and subsets which included only those respondents who were permitted by their employer to travel by both the mode used and the best alternative for the reported business trip. The results of these estimations are given in Section 3.

2. THE NATURE OF THE MODE CHOICES

In the course of our research on long distance business travel* two samples of business travellers were surveyed using almost identical questionnaires; one sample comprises travellers contacted while making a trip on British Rail's East Coast Main Line (this is called the ECML sample); the other sample comprises business travellers contacted through their place of employment (this is called the ORGN sample) (see Fowkes, Johnson and Marks (1985)).

Respondents to these two surveys were asked to supply information on:

1) the main travel mode, travel times, travel costs and other costs for a recent long distance business trip
2) how much quicker/slower and cheaper/dearer this trip would have been using the best alternative mode
3) which modes they were permitted (by their employer) to use on the reported trip.

Using the data on cost and time differences, for both the ECML and ORGN samples combined, we have calibrated random utility

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* A long distance business trip was defined to be one with a round trip distance of 50 miles or more.

models of binary mode choice for travel by car versus rail and air versus rail. There was not sufficient data to consider modelling the choice between car and air. Only 26 respondents reported such a choice, and gave cost and time data. 302 respondents had a choice between rail and car, and reported travel time and travel cost differences between these 2 modes. The data in Table 1 describes the nature of these choices in terms of whether travel by one mode dominated travel by the other (i.e. whether one mode was both faster and cheaper). For 72% of car users travel by car dominated travel by train. Only 5% of car users chose to travel by car when travel by train would have been both faster and cheaper. By contrast, 23% of train users chose to travel by train when it would have been both cheaper and faster to travel by car. These people were more likely to be travelling to London than other train users, which suggests their choice of mode was influenced by the difficulties of parking in and driving around London. One worrying thing about the data in Table 1 is that so few people (24%) were faced with a possible time/cost tradeoff, for it is these 'traders' who supply the bulk of the information required to calibrate the cost and time parameters in a mode choice model.

Because other costs such as hotel, taxi and meal bills could, in some cases, be as large as direct travel costs, we thought that ommission of the other cost data might explain why so few people were facing a time/cost tradeoff. Adding other costs to travel costs and looking at choices on the basis of total costs versus travel time, one gets the choices described in Table 2. (Note 67 of the original 302 respondents did not supply other cost data.) Again only 24% of respondents faced a possible time/cost tradeoff and a non-negligible proportion (16%) chose a dominated mode.

130 respondents had a choice between rail and air, and reported (travel and other) cost and time data for these 2 modes. Out of these 130 respondents only 46 faced an obvious time,cost tradeoff when making their mode choice decisions (Table 3). The data here do not appear to be of any better quality than that for the car versus rail choice. We had hoped for a greater proportion of potential traders amongst those people with an air/rail choice, because it seemed likely that air would generally be faster and more expensive than rail. This is clearly not always the case. 53% of the rail travellers said their journey would have been slower or taken about the same time if they had flown. Travel by rail was cheaper than travel by air for 95% of the rail users and 42% of the air users. It is possible these figures may be subject to cognitive dissonance, as is common in reported data of this kind. 84% of the people making the air/rail choice were travelling to London as compared with only 32% of the car/rail sample. The air/rail sample would therefore appear to comprise a more homogenous set of (possibly simpler) journeys.

TABLE 1 RAIL VERSUS CAR CHOICES: TRAVEL COST - TRAVEL TIME TRADEOFF

(number of respondents)

	Car Chosen	Train Chosen	Total
Car Dominates	94	41	135
Train Dominates	6	63	69
Car and Train Have Equal Costs and Times	12	15	27
Tradeoff Possible	18	53	71
Total	130	172	302

TABLE 2 RAIL VERSUS CAR CHOICES: TOTAL COSTS - TRAVEL TIME TRADEOFF

(number of respondents)

	Car Chosen	Train Chosen	Total
Car Dominates	68	33	101
Train Dominates	5	48	53
Car and Train Have Equal Costs and Times	12	13	25
Tradeoff Possible	15	41	56
Total	100	135	235

TABLE 3 AIR VERSUS RAIL CHOICES: TOTAL COSTS/TRAVEL TIME TRADEOFF

(number of respondents)

	Air Chosen	Rail Chosen	Total
Air Dominates	13	11	24
Rail Dominates	4	49	53
Air and Rail Have Equal Cost and Times	-	17	17
Tradeoff Possible	9	37	46
Total	26	104	130

3. RESULTS

Surveys of long distance business travellers have found the most important factors claimed by respondents to have influenced their mode choices were (in order of importance): convenience of departure times and accessibility, speed (i.e. travel time) and cost (Brocklebank (1982), Fowkes et al (1985), James et al (1979), LCCI (1984), MIL (1979), University of Southampton (1971)). In addition, the travel mode used for long distance business trips has been found to depend on the origin/destination of the trip, the number of meetings attended, distance travelled, whether the traveller was employed in the private or the public sectors and the traveller's status (Marks (1986)). From our surveys we have data on travel and other costs, travel times, the origin and destination of the journey, the number of meetings attended, the traveller's income, whether the traveller had access to a company car and reasons for choosing the travel mode, in particular, whether this was company policy or not. This data was used to construct the following 0-1 dummy variables:

(1) DLON = 1 if a London destination
0 otherwise

(2) DNM = 1 if more than 1 meeting was attended
0 otherwise

(3) DCCAR = 1 if the traveller had access to a company car
0 otherwise

(4) DCOP = 1 if the reason for choice of mode was company policy
0 otherwise

In addition to these 4 dummy variables, travel costs, other costs and travel times were used as explanatory variables in regressions. These regressions involved the estimation of the parameters of a binary logit model for the choice between the mode used and the best alternative for a recent business trip (reported by each respondent). All estimations were carried out using the MLOGIT software developed by M. Ben-Akiva.

In all estimations independent variables enter the models in the form of differences. For the car versus rail choice the values for each independent variable are calculated as the value of the variable for travel by car minus the corresponding value for travel by rail. Likewise in the air versus rail choice, rail values are subtracted from air values for each independent variable.

3.1 Car Versus Rail

It was expected that the estimated coefficients of the dummy variables for the car, rail choice would be as follows:

1) DLON would have a negative coefficient, because travel to London by rail is a lot easier than by car. Rail services into London are generally fast and frequent, and driving around and parking in London are difficult because of traffic congestion and insufficient parking spaces.

2) DNM would have a positive coefficient because travel between meetings is generally quicker and easier by car than by public transport.

3) DCCAR would have a positive coefficient because the traveller may be more inclined to use, and may also be encouraged to use, their company car for business trips.

4) The sign of the DCOP coefficient is not obvious for there is no reason why company policy should, a priori, be more important in determining travel by rail as compared with car. We note that virtually the same proportion of car and rail users (approximately 22%) gave company policy as a reason for their choice of mode.

Travel cost, other cost and travel time were all expected to have negative coefficients, given increases in each of these variables have a negative effect on either the employee's or the employer's welfare. Estimations were carried out on the complete set of respondents who supplied the required data and a subset (of this complete data set) comprising respondents who were permitted by their employer to travel by both car and rail.

The results for the complete data set are presented in Table 4. In the search for an appropriate model specification we started with the simple time, cost model given in column 1 of Table 4. Estimation results for this model give travel time and cost coefficients which are negative and significantly different from zero. The coefficient of the other cost terms is, however, positive, contrary to our a priori expectations, though it is not significantly different from zero (at the 5% level). Despite this it was decided to keep the other cost variable in subsequent regressions because there are good theoretical reasons for believing this variable should affect mode choices. Although the value of time estimate for Model 1 is high, at 34.8 p/min, it should be noted that its 95% confidence interval is very wide, ranging from approximately 13-59 p/min. The negative sign of the constant term in model 1 shows travellers would prefer travel by rail than by car, assuming all costs and times were equal.

The addition of the DLON dummy variable to Model 1 gives a large statistically significant improvement in model fit, and the negative coefficient of this variable confirms our a priori expectation that for trips with a London destination travel by rail is preferred to travel by car (Model 2, Table 4). The value of time estimate is now considerably lower than in Model 1 (21.9 p/min as compared with 34.8 p/min), although again the standard error is (approximately) 30% of the value of time estimate. The company car dummy variable was also found to have a statistically significant effect of the expected sign on mode choice (Model 3). However, inclusion of the dummy variables for the number of meetings attended (DNM) and company policy as the reason for mode choice (DCOP) did not give significant improvements in model fit (models 4 and 5, Table 4). Estimations in which cost was divided by the respondent's income (not shown) also gave no significant improvement in model fit.

Returning then to Model 3, the other cost coefficient is still positive and is significantly different from zero at the 10%, but not the 5% level. Removing the other cost variable from Model 3 gives Model 6 and, as comparison of the log-likelihoods for these two models shows, no significant reduction in model fit (the Chi-square statistic equals 3.16, that is less than the critical value of 3.84). Thus Model 6, in which travel cost, travel time, DLON, DCCAR and a constant term are explanatory variables, is our preferred model. The value of time estimate for this model is 23.5 p/min and has a standard error of 6.9 p/min. Such large standard errors are to be expected given our sample contains a relatively small proportion of individuals facing a cost-time tradeoff. Larger sample sizes are required to give more accurate parameter estimates.

Estimations on the smaller data set, containing respondents who were permitted to use both modes, gave similar results to those discussed above for the complete data set (Table 5). Again coefficient estimates for the dummy variables DLON and DCCAR were significantly different from zero and of the expected, while the addition of DNM did not give a significant improvement in model fit. However, the other cost coefficient was now positive and significantly different from zero, and the inclusion of the company policy dummy variable now gives a significant gain in

TABLE 4 ESTIMATED RESULTS FOR CAR VERSUS RAIL MODE CHOICE: THE COMPLETE DATA SET

(standard errors in brackets)

	1	2	3	4	5	6
Constant	-0.730 (0.187)	-0.279 (0.206)	-0.740 (0.267)	+0.016 (0.482)	-0.577 (0.283)	-0.7234 (0.266)
Travel Cost (£)	-0.028 (0.009)	-0.038 (0.010)	-0.038 (0.010)	-0.040 (0.011)	-0.037 (0.010)	-0.036 (0.010)
Other Cost (£)	+0.017 (0.011)	+0.021 (0.012)	+0.027 (0.014)	+0.027 (0.015)	+0.031 (0.016)	
Travel Time (mins)	-0.0096 (0.0014)	-0.0083 (0.0015)	-0.0089 (0.0016)	-0.0093 (0.0016)	-0.0095 (0.0016)	-0.0085 (0.0015)
DLON		-2.131 (0.457)	-2.403 (0.496)	-2.397 (0.498)	-2.469 (0.506)	-2.328 (0.483)
DCCAR			+1.069 (0.373)	+1.076 (0.378)	1.110 (0.379)	1.028 (0.366)
DNM				-0.928 (0.500)		
DCOP					-0.740 (0.424)	
L(0)	-162.196	-162.196	-162.196	-162.196	-162.106	-162.196
Log Likelihood	-118.061	-105.169	-100.772	-99.013	-99.215	-102.360
Rho-bar Squared	0.2627	0.3403	0.3651	0.3735	0.3722	0.3580
Value of Time (p/min)	34.78 (10.62)	21.85 (6.12)	23.51 (6.80)	23.34 (6.49)	25.521 (7.60)	23.49 (6.92)
No of Observations	234	234	234	234	234	234

TABLE 5 ESTIMATION RESULTS FOR CAR VERSUS RAIL MODE CHOICE: RESPONDENTS PERMITTED TO USE BOTH MODES

(standard errors in brackets)

	1	2	3	4	5	6
Constant	-0.709 (0.201)	-0.230 (0.224)	-0.593 (0.280)	+0.281 (0.467)	-0.386 (0.301)	-0.376 (0.300)
Travel Cost (£)	-0.028 (0.009)	-0.038 (0.011)	-0.037 (0.011)	-0.039 (0.011)	-0.036 (0.011)	-0.031 (0.011)
Other Cost (£)	+0.025 (0.012)	+0.030 (0.014)	+0.035 (0.015)	+0.030 (0.014)	+0.039 (0.017)	
Travel Time	-0.0108 (0.0016)	-0.0096 (0.0016)	-0.0101 (0.0017)	-0.0098 (0.0016)	-0.0108 (0.0018)	-0.0100 (0.0017)
DLON		-2.095 (0.482)	-2.360 (0.519)	-2.076 (0.472)	-2.430 (0.530)	-2.336 (0.509)
DCCAR			+0.893 (0.404)		+0.896 (0.410)	+0.864 (0.400)
DNM				-0.629 (0.504)		
DCOP					-0.925 (0.475)	-0.938 (0.483)
L(0)	-148.334	-148.334	-148.334	-148.334	-148.334	-148.334
Log-likelihood	-101.451	-90.199	-87.626	-89.430	-85.671	-87.883
Rho-bar squared	0.3063	0.3803	0.3951	0.3827	0.4058	0.3904
Value of Time (p/min)	38.52 (12.50)	25.43 (7.52)	27.42 (8.46)	25.17 (7.27)	29.91 (9.60)	32.06 (11.30)
No of Observations	214	214	214	214	214	214

model fit (compare models 5 and 3, Table 5). The negative sign of the cofficient for the DCOP variable (Model 5) indicates that company policy is more important in determining travel by rail than by car. That the effect of the DCOP variable is more significant here than in estimations on the complete data set is to be expected, given the latter data set contains the preferences of employers who, of course, are not constrained by company policy.

Omitting the other cost variable from Model 5 gives Model 6 and a significant loss in explanatory power. To explain this (unexpected) positive sign on the other cost variable, one could argue that this occurs because the traveller derives positive utility from items such as hotel stays and meals taken on the business trip. If this was so one would expect, as we have found, a weaker positive effect in estimations on the complete data set because here mode choices also incorporate the preferences of some employers. Nevertheless, we are not wholly convinced by the above explanation of the positive other cost coefficient.

Comparison of the value of time estimates obtained from the complete data set and the data set comprising only people permitted to use both travel modes, shows the former are smaller than the latter, though differences are not statistically significant. Employees' and employers' preferences do not appear to differ substantially in our data.

3.2 Air Versus Rail

As with the car versus rail choice the basic time, cost model was augmented with dummy variables for a London destination (most other air trips were out of London) and whether company policy was a reason for choosing the travel mode. The number of meetings attended and having access to a company car were not considered relevant to the choice between air and rail. For trips with a London destination we expected that travel by rail would be preferred to travel by air because access to central London is easier by rail than air. Hence the coefficient of the DLON variable was expected to be negative. Again there are no good reasons, a priori, for expecting either a positive or negative sign on the company policy variable. Though we note that a much higher proportion of rail than air travellers (21% versus 4%) gave company policy as a reason for their mode choice. This led us to expect a negative sign on the DCOP coefficient.

Taking first the estimations on the complete data set, the basic cost,time model gives a satisfactory fit to the data (Rho-bar squared equals 0.4054), and the cost and time coefficients all have the expected negative signs. Although the coefficient of the travel cost variable is not quite significant at the 5% level, this variable was retained in further regressions because there are good theoretical reasons for doing so. The addition of the company policy dummy variable (DCOP), but not the London destination dummy variable (DLON), gave a significant improvement in model fit, and coefficients for both variables were of the expected sign. Dividing the the cost variables income did not give any significant improvement in model fit (not shown). Thus Model 2, Table 6 is the preferred model for this data set. The value of time estimate for this model is 19.1 p/min, but is not quite significantly different from zero at the 5% level. The large standard error of this value of time estimate is almost certainly caused by the small sample size and the even smaller number of respondents facing a cost, time tradeoff. The positive constant term in model 2 suggests that travel by air is preferred to travel by rail, assuming all other explanatory variables are the same for both modes.

Restricting the data set to only those respondents who were permitted to travel by both air and rail gives, not surprisingly, value of time estimates with even larger standard errors and statistically insignificant travel cost and DCOP coefficients (Table 7). It would appear that there are insufficient observations to accurately identify the these parameters and the value of time estimates. However, we note that the value of time estimates for this smaller data set are similar to those obtained in estimations on the complete data set.

TABLE 6 ESTIMATION RESULTS FOR AIR VERSUS RAIL MODE CHOICE: THE COMPLETE DATA SET

(standard errors in brackets)

	1	2	3
Constant	-1.699 (0.355)	1.489 (0.358)	-0.633 (0.588)
Travel Cost (£)	-0.021 (0.011)	-0.021 (0.011)	-0.023 (0.011)
Other Cost (£)	-0.040 (0.015)	-0.038 (0.015)	-0.035 (0.016)
Travel Time	-0.0036 (0.0012)	-0.0041 (0.0014)	-0.0038 (0.0013)
DLON			-1.023 (0.585)
DCOP		-2.059 (1.083)	-2.249 (1.107)
L(0)	-90.109	-90.109	-90.109
Log-likelihood	-52.338	-49.462	-47.981
Rho-bar Squared	0.4054	0.4337	0.4462
Value of Time (p/min)	17.22 (10.03)	19.08 (10.83)	16.17 (8.64)
No of Observations	130	130	130

TABLE 7 ESTIMATION RESULTS FOR AIR VERSUS RAIL MODE CHOICE: RESPONDENTS PERMITTED TO USE BOTH MODES

(standard errors in brackets)

	1	2	3
Constant	-1.480 (0.379)	-1.295 (0.384)	-0.833 (0.572)
Travel Cost	-0.015 (0.012)	-0.017 (0.013)	-0.016 (0.012)
Other Cost (£)	-0.034 (0.014)	-0.032 (0.015)	-0.033 (0.015)
Travel Time	-0.0033 (0.0014)	-0.0037 (0.0015)	-0.0031 (0.0013)
DLON			-0.816 (0.566)
DCOP		-1.754 (1.107)	
L(0)	-70.008	-70.008	-70.008
Log Likelihood	-47.836	-46.026	-46.828
Rho bar-squared	0.2958	.3154	.3035
Value of Time (p/min)	22.30 (20.21)	21.99 (18.04)	19.88 (17.78)
No of Observations	101	101	101

4. CONCLUSION

The analysis of revealed preference (mode choice) data for long distance business travel reported in this paper has shown that, in addition to travel time and travel cost, non-travel costs (e.g. accommodation and meals), company policy, having a London destination and, in the case of the car versus rail choice, access to a company car all have significant influences on mode choice. The traveller's income and the number of meetings attended were not, however, found to affect mode choices. Work by other authors has also found travel cost and travel time (in some cases broken down into components such as main mode, in-vehicle time, waiting time, other in-vehicle time), service frequency, household income and car availability may have significant effects on business travellers' mode choice decisions (Marks (1986)). Our results are in broad agreement with this work, though we did fail to find a significant income effect. Lack of relevant data meant we were unable to either break travel time down into different components or include service frequency in our models. However, our work has shown the influence of non-travel costs, the trip destination and company travel policies should be taken into account in any future work on mode choice analysis for long distance business travellers.

To our knowledge, the only other study comparable to our own is that by University of Leeds (1971). In this study the choice of travel by rail versus air was modelled for different routes in Great Britain, using reported cost and time data for the mode used and constructed data for the alternative mode. Values of time were found to range between 35% and 85% of hourly household income. Putting these values in 1984 prices, by applying the change in median household incomes between 1969 and 1984 as measured by the Family Expenditure Survey (Central Statistical Office (1970,1985)) to the University of Leeds values, one gets values of time ranging from around 4 p/min to 13 p/min. These values are substantially smaller than those obtained in our work. However, because small sample sizes meant our estimates have relatively large standard errors, further work either employing larger data sets or making use of hypothetical choice (i.e. stated preference) data is required to validate these or our own results. We did collect responses to a stated preference mode choice experiment in the surveys and this data gave values of time of around 12 p/min (Marks and Fowkes (1986)). These results are not, however, directly comparable with those given in this paper, because in the stated preference experiment respondents were asked to trade their own money against possible time savings: in actual choices it is the employer's money which is traded against time savings. It would appear, therefore, that employees are more willing to spend their employers' money than their own money to save time, though the caveat concerning the wide confidence intervals for our revealed preference value of time estimates weakens this conclusion.

Given our findings that employees are more ready to spend employers' money than their own to save travel time, and that revealed preference models tend to be dominated by employees' preferences, we conclude that the valuation produced by revealed preference models has no relevance to the economic appraisal of time savings. It is, however, of great importance in forecasting exercises.

REFERENCES

Brocklebank, P.J. (1982) Intercity Business Travel Policies - Some Empirical Findings, Institute for Transport Studies, Technical Note 100.

Central Statistical Office (1970) Social Trends 1970, No. 1 HMSO: London

Central Statistical Office (1985) Social Trends 1985, No 26 HMSO: London

Fowkes, A.S., Johnson, I. and Marks, P. (1985) Long Distance Business Travel and Mode Choice: The Results of Two Surveys of Business Travellers, Institute for Transport Studies, Working Paper 211.

Grayson, A. (1981) Disaggregate Model of Mode Choice in Intercity Travel, Transportation Research Record, 835.

James, V.Z., Marshall, J.N. and Waters, N.S. (1979) Telecommunications and Office Location, Centre for Urban and Regional Development Studies, University of Newcastle Upon Tyne, March 1979.

London Chamber of Commerce and Industry (1984) Air Travel Survey 1984.

Marks, P. (1986) Long Distance Business Travel - A Literature Review, Institute for Transport Studies, Technical Note 180.

Marks, P. and Fowkes, A.S. (1986) Stated Preference Experiments Concerning Long Distance Business Travel in Great Britain, Institue for Transport Studies, Working Paper 219.

M.I.L. Research Ltd (1979) A Study of Frequent Business Travellers Between West Yorkshire and London, September 1979.

Stephanedes, Y.J., Kumar, V. and Padmanabhan, B. (1984) A Fully Disaggregate Mode Choice Model for Business Intercity Travel, Transportation Planning and Technology, Vol. 9, no. 1.

Stopher, P. and Prashker, J.N. (1976) Intercity Passenger Forecasting: The Use of Current Forecasting Procedures, Transportation Research Forum, Vol. XV11, Part 1.

University of Leeds (1971) Intercity Modal Split in Great Britain: Air V Rail, Centre for Transport Studies, Univeristy of Leeds.

University of Southampton (1971) VTOL: A European Study (Potential Sites and Business Travel), Volume 3: Business Travel, September 1971.