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**RESULTS OF THE HUMBER BRIDGE COMMERCIAL
USERS' SAMPLE SURVEY**

DAVID SIMON

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ABSTRACT

SIMON, D. (Nov. 1984) Results of the Humber Bridge Commercial Users' Sample Survey. Working Paper 183, Institute for Transport Studies, University of Leeds.

As part of a study into the economic impact of the Humber Bridge on commercial transport, 52 regular bridge-using firms were surveyed. This paper sets out the results and includes a copy of the questionnaire used. The survey sought to understand conscious decision-making and analyse the extent to which firms have adapted to take advantage of distance-based time and cost savings. Significant variation was discovered, depending on a range of operating characteristics such as, geographical market area and size, economic sector, location relative to the Humber Bridge, degree of diversification, nature and length of trips, drivers' hours and payment system, and delivery/loading time constraints. Notwithstanding some data problems, particularly regarding cost adjustments, most firms regard the value of time savings to be a notable benefit. On this sample's evidence, the Humber Bridge has a positive, though still moderate, impact on transestuarine economic integration in Humberside.

Results of the Humber Bridge Commercial Users' Sample Survey

David Simon

1. Introduction

This paper is one in a series reporting preliminary findings of the ESRC - sponsored project, "The Economic Impact of the Humber Bridge on the Carriage of Goods". The economic underpinnings of the study are reviewed in Mackie and Simon (1984), while Simon (1984a) analyses the Humber Bridge's history and relevant regional development issues. The purpose here is to present the results of a stratified sample survey of regular bridge-using firms, which formed a crucial element of the study. More detailed discussion of issues arising from these results will appear in a subsequent paper.

Two roadside surveys undertaken in May 1982 and October 1983 have provided a comprehensive picture, on a range of relevant variables, of commercial traffic using the bridge (Simon 1984b). From these data, and also a list of firms which purchased at least £5000 worth of toll vouchers from the Humber Bridge Board during 1981/82 (the bridge's first year of operation), a sample frame of 75 major user firms was drawn up for more detailed investigation (ibid: 22-25). The purpose of this survey was to gain an insight into the bridge's impact on firms' operations as a prerequisite for evaluating current Department of Transport road improvement appraisal procedures. While the roadside surveys were adequate to establish the overall pattern of bridge usage, more detailed information was required in order to ascertain to what extent, if at all, firms have adjusted their operations so as to maximize benefits derived from the bridge. This order of data could only be obtained from management direct, and the complex nature of the subject suggested structured in-depth interviews using questionnaires as the most appropriate methodology.

It could be deduced a priori that regular users would have determined their policy towards the bridge most clearly and would be in a position to provide details of those responses. Furthermore, regular users are more likely to have adjusted their operations than irregular or occasional users. Regularity of use was therefore the primary criterion adopted in drawing up the sample frame as just described, on the assumption that irregular users make simple ad hoc adjustments and thus generally derive only minor benefits in comparison to regular users. Furthermore, since many of the regular users would inevitably be large local firms or branches/depots of major national and international corporations, the sample would be likely to account for a significant proportion of commercial traffic over the bridge, thus enabling the drawing of statistically valid conclusions. However the bridge might have had a proportionally

greater effect on small local distribution or service firms to which the transestuarine market became accessible for the first time, although their absolute number of bridge crossings would be small. For this reason, the sample frame was enlarged to include some randomly selected small firms enumerated in the roadside surveys.

It is important to emphasize again that the sample was not intended to be representative of all commercial bridge users, but rather of regular users for which the bridge is a significant factor.

Firms in the sample frame were stratified by sector and geographical area, to ensure that the sample comprised a representative spread of major locations on both banks. The major coupon purchasers and important bridge users derived from the roadside surveys (between which there was significant overlap, as expected) were invariably located in Humberside or north Lincolnshire, thus simplifying logistical aspects of the survey. Firms were selected on a stratified random basis, and those refusing us an interview were replaced with as close a substitute as possible. The final sample size was 52. Interviews, generally lasting from 45-90 minutes, were conducted by Peter Mackie and the author with branch, depot or transport managers by one or both of the researchers between March and June 1984. Form completion was by interviewer, not interviewee. The first eight interviews formed a pilot study, as a result of which minor modifications were introduced to the questionnaire while questions 12 and 14 were omitted (see Appendix).

2. General Sample Characteristics

The questionnaire comprised several sections. The first consisting of questions 1-4, elicited general information about the firms' activities and fleet composition.

(a) Sectoral Breakdown: The same NST-based classification system could not be used in deriving Table 1 below, as for analysis of the roadside survey data (Simon 1984b), since the focus here is on firms rather than commodities being carried. Consequently the more appropriate Standard Industrial Classification (SIC) has been employed. This reveals a broad sectoral distribution, with nearly one third of the sample concentrated in haulage, and the three largest categories, namely haulage, energy production and distribution, and wholesaling, accounting for over half the firms. The various categories comprising Food, Drink and Tobacco total another 25% of the sample. While these are regionally important sectors (cf. Simon 1984a: 16), they appear overrepresented here. Business and professional services are significantly underrepresented. The sample was not, however, intended to be strictly representative of regional employment, but of bridge-using firms. This requirement is met (cf. Simon 1984b:9).

Table 1

Sectoral Composition of the Survey Sample

SIC	Description	%
1630	Prod/distrib of other forms of energy	13.5
2310	Extraction of stone/clay/gravel	3.8
2420	Cement, lime, plaster	1.9
4116	Processing organic oils/fats	1.9)
4130	Preparation of milk/milk products	1.9)
4147	Fruit/vegetable processing	3.8)
4150	Fish processing	3.8)
4160	Grain milling	1.9)24.7
4196	Bread and flour confectionery	1.9)
4221	Compound animal feeds	3.8)
4270	Brewing and malting	3.8)
4283	Soft drinks	1.9)
4539	Manufacturing : other dress industries	1.9
4751	Newspaper printing and publishing	1.9
50	Construction	1.9
61	Wholesale distribution	11.5
7230	Road haulage	30.8
7630	Supporting services to sea transport	1.9
77	Miscellaneous transport services n.e.s.	3.8
9230	Cleaning services	1.9
Total		100

(b) Figure 1 shows the geographical distribution of the sample. 56% of the firms are located south of the Humber and 44% north of it, the latter overwhelmingly in greater Hull. South bank firms are more evenly spread, although 17 lie within the Grimsby-Immingham-Killingholme complex, and a further 6 in greater Scunthorpe. Forty four firms (85%) are thus concentrated in Humberside's three chief urban areas while only three firms lie outside the county boundary, in Lincolnshire. This distribution is representative of regular bridge users but, as stated above, NOT of all user firms.

(c) Organization of firms

(i) There are known to be many significant differences in operation between own account and hire-and-reward firms (e.g. Edwards and Bayliss 1971). These derive in the main from the fact that, whereas the transport function is frequently subordinate to production, wholesale or retail sale in own account firms, to hauliers it is the *raison d'etre*. Many of the

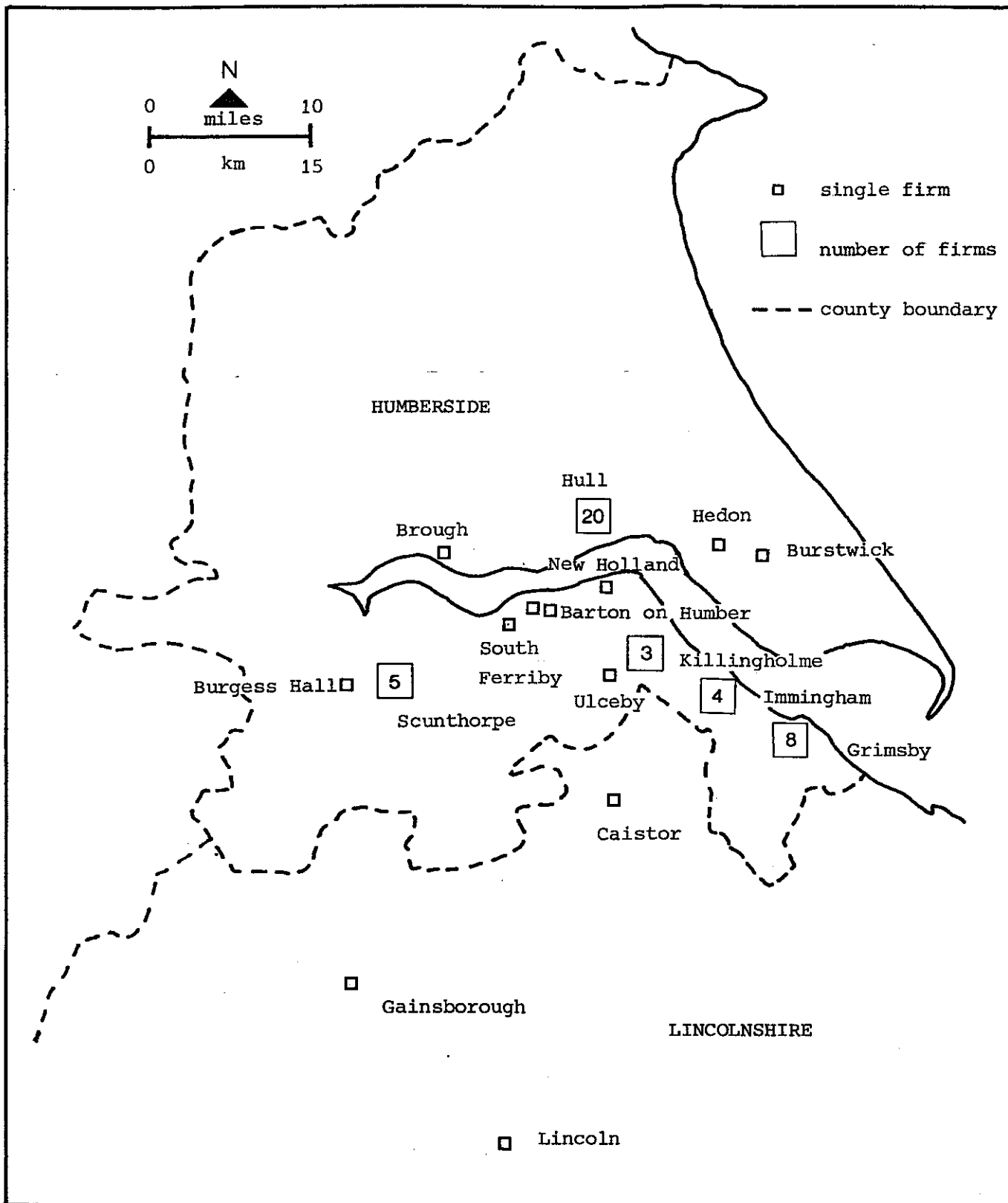


FIGURE 1

LOCATION OF FIRMS IN SAMPLE SURVEY

distinctive operating characteristics are relevant to this study (Mackie and Simon 1984), and the sample breaks down as follows:

- 28 (53.8%) own account only
- 5 (9.6%) own account mainly
- 15 (28.8%) hire and reward only
- 2 (3.8%) hire and reward mainly
- 2 (3.8%) both in equal proportions

(ii) The forms and scale of ownership and control of firms in the sample also varies greatly, with local or regional private companies forming the largest single category:

- local or regional	20	(38.35%)
- national - HQ	11	(21. 2%)
- - branch/depot	10	(19. 2%)
- subsid of multinational - HQ	2	(3. 8%)
- - branch/depot	9	(17. 3%)

(d) Vehicle Fleets: The combined commercial vehicle fleets of the 52 sampled firms totals 1275, an average of 24.5. The range was from zero (a case where all transport was bought in) to 120. Forty five percent of the total, ie. 580 vehicles are rigid and 55% i.e. 693, articulated.* This yields an average of 11.2 rigids and 13.3 articulated units per firm. Table 2 provides a more detailed breakdown by gross weight class and number of axles. Note that vehicles subcontracted on a full-time basis and run as part of respondent firms' fleets, as well as spare vehicles, have been included. Conversely, buses and reps' cars have been excluded, since they are not directly relevant to the present study, except that firms' total expenditure on bridge tolls includes all vehicles on their books (see below).

Figures reported by firms may contain an element of error, since respondents occasionally appeared to confuse unladen and gross vehicle weights. There must be doubt about the size of 3- and 4- axled 12-16 tonners too, although some of these are specialized vehicles e.g. tankers. Many firms have increased their fleet capacities in recent years, often by purchase of larger rather than more vehicles. The large number of 5- axled vehicles cited in Table 2 reflects this trend. To what extent this trend can be attributed to Humber Bridge - induced business generation will be discussed below.

3. Operating Characteristics

Section Two of the questionnaire, comprising questions 5-7, focuses on a range of operating and scheduling characteristics likely to have a bearing on the extent to which firms have been able to exploit the bridge. Particularly germane here is the

* Details on two are missing.

Table 2

Fleet Composition of the Sample*

		no. of axles				Total	%
		2	3	4	5		
g.v.w (tonnes)	0 - 3½	126				126	9.9
	3½ - 7	29				29	2.3
	7 - 12	109				109	8.6
	12 - 16	70	13	32		115	9.0
	16 - 20	36	12	4		52	4.1
	20 - 24		103	12		115	9.0
	24 - 28		15	18		33	2.6
	28 - 32½			522	1	523	41.1
	32½ - 38			4	167	171	13.4
	Total*	370	143	592	168	1273	100.0

*excluding 2 for which details are unknown

the work of Fleischer (1962) and Thomas (1983), as explained elsewhere (Mackie and Simon 1984).

(a) Market Areas : Given the nature of Humberside's road network in relation to the Humber Bridge, the different subregional economic structures on either side of the estuary, and the severe current recession (Simon 1984a), it seems likely that the bridge will prove more important to firms serving a purely local or regional, rather than national, market. Over half of the firms sampled do in fact serve only a local or regional market, while 46% serve larger geographical areas (Table 3)*.

This provides prima facie evidence that, despite oft-cited inadequacies in the road network southwards into Lincolnshire and beyond, economic linkages via road transport between Humberside and other regions are significant. This is perhaps the more noteworthy in view of the supposedly intraregional role performed by the Humber Bridge (Simon 1984) but does not, of course, imply that all or even most cross-bridge trips by the interviewed firms were inter-regional. Rather, it appears that major bridge-using firms are also frequently interregional operators. Several of the locally based firms serving wider markets have expanded from small initial operations, though generally before the bridge opened. For a few, particularly services, this is not the case; the significance of the bridge to all firms will be discussed in another section.

* In several cases of inter-regional trunking, however, only one or two locations within these larger areas are involved. Similarly not all commodities handled by individual firms are transported over the same distances.

Table 3

Market Areas and Location of Firms Sampled

AREA	No.	%	Location		
			South Bank	North Bank	Both Banks
Great Britain	13	25.0	9	3	1*
England & Wales	3	5.8)		
N. England & Scotland	3	5.8)		
England	1	1.9)		
N. England, Midlands,) 5	4	2 ^a
Wales	1	1.9)		
N. England	3	5.8)		
Regional:					
Yorkshire, Humber-					
side, Lincolnshire	14	26.9	11	2	1 ^b
Local:					
Humberside or part					
thereof	14	26.9	0	12	2 ^c
T O T A L	52	100.0	25	21	6

* HQ on north bank.

^a One HQ on north bank; the other has two separate branches.

^b HQ on south bank.

^c One HQ on each bank.

There appear to be few clear sectoral or firm status differences by geographical scale of operation, although some trends are evident:

1) Hauliers tend to serve the national market, or a significant part of it, despite 10 of the 15 sampled being locally based firms with single premises. Of the 5 branches, 1 serves nationwide, 1 England and Wales, 1 N. England and Scotland, 1 N. England, and 1 the local area only. The latter is the only local-scale haulier. At the regional scale there are only two hauliers, one partly a merchant. These findings probably reflect the nature of haulage rather more than the fact that most firms sampled are comparatively large operators. Several firms do concentrate on medium to short haul, but still have important national trade in some commodities. The operating range depends on owners' targets and energies, but also cost thresholds for exceeding the range reachable by a return journey within a driver's shift, and the unit value of each commodity (net value added). National operations tend to be distribution of imports through Humberside ports or local produce (especially steel, frozen foods, fertilizer). Margins are low, and competitiveness over rates high, according to all interviewees - ie. not all contracts are secure, and fluctuations are possible. Backhauls are important to most local firms; and occasionally even to non-hauliers e.g. steel distributor, Chandler, imported food distributor. Most hauliers are based in S. Humberside - reflecting the importance of agriculture, steel and fishing to this industry. Similarly, they are more likely to use the bridge for access to the dock and industries of Hull; save for use of Immingham docks, there was little demand by north bank hauliers for the bridge. The M62 and M18 provide their preferred access routes to other regions.

2) Petroleum products/gas are distributed on a local or regional basis by branches of national/multinational firms. There are two exceptions: 1 private local firm, and 1 local firm contracted to distribute for an oil major.

3) Perishables and services are generally distributed locally, sometimes with trunking to depots in adjacent regions e.g. bread, dairy produce, newspapers, parcel delivery, cleaners. Also beer, soft drinks, roadstone/gravel, agricultural feeds - having very low unit value or high bulk:value ratio. Firms active at this scale are branches/depots, local subsidiaries, and purely local firms, in roughly equal proportions.

4) Perhaps the most important geographical distinction arising from the data is that between the areas served by firms on the respective banks of the Humber (Table 3).

This dichotomy is clear at all levels except extraregional parts of England and/or Wales/Scotland, where there is parity. The data probably reflect three factors, firstly the importance of agricultural products and processed foods from the south bank and

also Scunthorpe steel to the national consumer market. Many of these commodities are moved by hauliers, as stated above - hence the latter's concentration on the South bank. Secondly - at the regional scale - must be the location of the petrochemical industry at Killingholme-Immingham on the south bank. Most of these products are distributed ex-refinery or harbour on a regional basis by road. Beyond the region, petroleum products are piped or barged to other depots e.g. in Leeds or Sunderland. Thus the refineries have interregional significance beyond that detected in the roadside surveys (Simon 1984b). The third factor is Hull's greater and more concentrated population, suggesting it as optimum location for local distribution depots, and for higher order services. While the bridge may have altered this equation for some (especially new firms), all those surveyed predated the bridge. One parcel delivery firm in Scunthorpe (the depot of a national firm) refused an interview, but is known to have opened explicitly because of the bridge.

(b) Seasonality of Trade: Many agriculturally based and construction industries are known to experience marked seasonal fluctuations in activity. These are relevant here at two distinct levels. Firstly, such trends may affect the representativeness of aggregate scale roadside surveys taken at one point in time, although the fluctuations in different industries may not coincide. The roadside surveys for this study were conducted in spring and autumn, approximately mid-way between the summer peak and winter trough in Humber Bridge traffic volumes (Simon 1984b:1). Secondly, at the individual company level, seasonality affects the regularity and overall frequency of bridge usage, in some cases perhaps even restricting the extent of potential reorganization.

A significant proportion of the sample reported no marked seasonality, but the following sectors warrant mention:

- Brewing: Christmas and summer peaks > 30%.
- Milling and Baking: moderate summer peaks.
- Cement, sand, roadstone, construction: deep winter trough with virtual cessation of some projects; spring-summer peaks apart from builders' vacation.
- Wholesale distribution: fair summer trough for foods; Christmas trough for timber; little fluctuation in general goods.
- Parcel delivery: large mail order peak Sept-Dec.
- Fuel distribution: marked seasonality for individual products e.g. domestic and agricultural heating oil peaks in winter, white spirit in summer. Impact thus depends on firm size and range of products sold: large firms - little variation overall.
- Haulage: slight to moderate summer trough before the cereal harvest. One fifth of firms were also quiet in spring.

(c) Number and Nature of Journeys Per Day

(i) Many firms reported a wide range of figures on this

variable, particularly if they engage in both local and long haul work. Simple data aggregation would thus have very limited value, hence the two categories are calculated separately here. Intrasectoral variation is also as wide as that between sectors.

Local or regional the 35 firms providing definite data make an average of 2.5 daily trips per vehicle (range 1-6). Another 6 firms had to be excluded by virtue of inadequate data.

Trunking the average is 0.9 daily trips per vehicle for the 17 firms providing data (range 0.3-2); while one firm was excluded from the analysis.

ii) Single versus multidrop delivery is another relevant distinction since there is some relationship between the length of haul and number of drops. Trunk hauls tend increasingly to be unit loads, with local distribution undertaken separately from a depot if required. Thirty seven firms undertake significant single drop delivery on a regular basis, and eighteen multidrop. Four firms fall into both categories, and two did not respond.

(d) Delivery Constraints on Scheduling

On the whole these are not severe, and may be categorized as follows:

1) Local Distribution

i) 6 firms mentioned pedestrian zones/restricted delivery hours in CBDs; also opening times for delivery at clubs, restaurants (brewery; soft drinks; parcels delivery; cleaners). Also quiet times at aged homes etc (heating oil). But such areas/places usually comprise a relatively small % of customers - so can adjust schedules/routes somewhat.

ii) perishables - rapid delivery from fields to factory is necessary for peas and vegetables (2 firms); from production point to depots/shops/homes - for newspapers, bread, milk/dairy produce (3 firms). Hence night trunking, 24 hr operations, or large fleets not fully utilized i.t.o. time, but intensively used at particular times. This also circumscribes market area, although distribution depots important here. Specialized vehicles are also used - e.g. reffridgerated box lorries.

2) Haulage and General Distribution

i) Waiting time on construction sites, mills or at delivery points, coupled with early afternoon deadlines for bulk delivery at factories, especially on Fridays. This affects hauliers. 21 firms cited such problems, with varying degrees of severity. Adaptations:

- two-way radios in cabs for immediate contact

- increasing trailer fleet to 2-3 times the number of tractor units - so that drivers can simply switch trailers and return without delay. One distributor of imported food (meat and dairy) does this with refrigerated trailers and claims customers value the additional storage space!
- attempt to charge demurrage for inordinate delays - but this is now increasingly difficult because of competitive undercutting. Thus some firms simply have to bear costs themselves.
- timed deliveries, although theoretically a constraint on fleet flexibility, tend to cut waiting time or enhance ability to obtain demurrage. There were some complaints that industry was forcing the transport sector to absorb the slack or wasted time.
- many firms, fuel and cement distributors in particular, complained of too many customers demanding timed delivery. This proves problematic if too many want simultaneous service e.g. early morning. So several firms refuse such restrictions, offering only am. or pm. stipulations, which apparently satisfy most customers.
- build in some slack for flexibility.
- reorganize depot locations.

ii) Hull docks - limited hours, closure over meals etc., and labour militancy. This was cited by 25% of hauliers, and held to be a reason for much cargo switching from Hull to Immingham or even Grimsby over the last few years (see Simon 1984a). The most severe constraint was on a firm specializing in road/rail container transfer, with much harbour import/export. This proved a double constraint because of the train capacity limit, necessitating a fair degree of slack.

iii) The limited storage capacity of customers' gas or agricultural feed tanks/silos, coupled with the need for continuous flow, requires fine-tuning in delivery schedules (2 firms).

iv) Industry - specific constraints e.g. variability of ship destinations and docking times - for ships' chandlers; loading space at print works for newspaper distributors (2 firms).

24 firms either claimed no real constraints or felt those cited (included in above analyses) not to be very serious.

e) Drivers' hours

i) A fair degree of standardization emerges from the data, with a guaranteed minimum number of hours per week and variable overtime opportunities. The lowest number guaranteed are 37½ hours in two cases (newspaper; petrol and LPG distribution), the majority being 39 or 40 (23 cases), 42½-45 hours (7). Only 4 cite 47½-50 hours, 3 cite 55 hours, while 12 work from 57½ hours up to the maximum 60 hours permitted under EEC regulations.

weekly hours	no.	%
37½	2	3.9
39-40	23	45.1
42½-45	7	13.7
47½-50	4	7.8
55	3	5.9
57½-60	12	23.5
Total	51	99.9

Table 4

Drivers' Weekly Hours
of Work

NB : 1 response excluded

ii) 5-day working weeks are the norm, with only 9 (17.6%) regular working 5½-6 days. The additional half day is invariably Sat. a.m., often at overtime rates, and the sixth day Saturday, although several hauliers and trunk distributors provide 7-day operations on a rota system for weekend days.

iii) no clear sectoral differences are apparent, with the three largest sectors in the sample (haulage, energy production/distrib, and wholesale distrib) displaying the full range of guaranteed hours discussed above. Only 1 out of 6 wholesalers work longer than 5 days, while one energy distributor worked a sixth day if required. The major contrast is in the haulage, where 6 out of 16 hauliers work 5½ or 6 days regularly (1 according to demand). These three sectors thus account for 8 of the 9 firms working longer than 5-day weeks.

(f) Payment system

i) In virtually all cases, the guaranteed minimum number of hours are paid as a basic wage computed at an hourly rate, or more rarely, as a fixed payment.

ii) It is in opportunities for earning overtime, however, that significant differences emerge. Overtime is generally 1½ x normal rates on weekdays and Saturdays (although two firms pay only 1.1/4x on Saturdays), with double time on Sundays. One firm of ships' chandlers operating internationally, pay up to triple time abroad. The extent of overtime working varies widely : a handful of firms have none at all, several have it occasionally as dictated by need, while most have regular but fluctuating amounts between the guaranteed minimum and EEC legal maximum. Six firms in different sectors have actually institutionalized overtime to the extent of paying the basic rate for only part of the guaranteed minimum weekly employment. The number of hours thus paid at overtime rates ranged from 5 to 20, the latter extreme being a haulier.

iii) Only a minority of firms operate productivity or other bonus schemes, and these vary widely in nature. 6 of the 16 hauliers pay their drivers 7-10% of their vehicles' weekly earnings rather than overtime, although one firm has both. Two of the six petrol/gas distributors have profit or productivity-based bonus

schemes, in one case over and above a 15% shift allowance. Several other firms pay bonuses above a threshold level of vehicle mileage covered or tonnages carried, no. of parcels, newspaper pages, cases of bottles or kegs of beer delivered per week. In some cases arrangements are necessary to ensure equity between drivers : either drivers rotate routes* on a roster basis, or those on less remunerative routes are given a money supplement or lower bonus threshold.

By far the most complex system operates in the brewing industry, where wages are calculated on a 'standard minute payment' basis, in terms of which measured time allocations (and payment) pertain to each activity - driving, loading, unloading etc.

Job and finish is still practised in a wide spectrum of firms. In many cases, hauliers and distributors calculate job times on the basis of low assumed average vehicle speeds - often in terms of longstanding union agreements. These speeds of between 26 and 35 mph are outdated, having been set before the motorway era or advent of more powerful HGVs, and seldom adjusted since then. Management asserts this to be an effective form of bonus, providing an incentive for drivers to return early for greater leisure time under job and finish, or to do additional work if payment is time-based. It is thus possible for a driver to be paid for, say, 14 hours while actually working only ten, if the allocated time for 2 journeys is 14 hours at the agreed speed, but he drives fast enough to complete them both in 10 hours (i.e. under the legal limit). While this arrangement may encourage speeding, it is claimed to benefit both employer in terms of higher turnover per unit time and employee in the manner described. We shall return to this question in a later paper when considering the distribution of benefits from savings enabled by the Humber Bridge. The effects are certain to be greatest under job and finish, mileage-based and productivity-based payment systems.

(g) Scheduling and Use of Sub-contractors

Of forty six firms for which data are available, 32 (70%) schedule their transport operations on a daily basis, citing the need for delivery or contractual flexibility or the fluctuating nature of their business. This is true particularly for the haulage industry, but also for distributors of petrol/gas, animal feeds, roadstone and gravels, timber, as well as several wholesalers. The 30% of firms able to schedule weekly fall into the brewing, soft drinks, dairy products, frozen foods and edible oils industries, as well as newspaper and parcel delivery. Essentially these products are delivered to customers once per week (or day), with delivery on specified routes each day. Some

* a system which gives added flexibility to employers in case of illness or holiday cover, as all crews are familiar with all routes.

flexibility is, nevertheless, normally built in to enable additional deliveries to be made at short notice according to demand fluctuations. Although petrol/gas distribution may have been expected to fit this pattern, since a narrow range of standardized products is being delivered on contract to a well-defined set of customers, it appears that the degree of short-run change in demand by a significant proportion of filling stations and industries is such as to warrant daily rather than weekly scheduling.

Only 9 firms make permanent or regular use of subcontractors, three of them indeed relying wholly on contracted distribution while another 6 use them irregularly or to cover seasonal peaks. There is no noticeable difference between the firms in these 2 categories, which are chiefly hauliers and distributors of frozen foods and roadstone/gravel. Subcontracted transport may be becoming progressively more important over time: respondents cite the increasing absolute and opportunity cost of maintaining vehicle fleets on own account as underlying their behaviour. Several firms reduced fleet size during the 1978-1983 period of deepening recession, and are now reacting cautiously to the signs of recovery by deferring renewed fleet investment in favour of partial sub-contracting. Margins have shrunk and uncertainty increased - particularly in haulage: some larger firms now maintain only the number of vehicles they can keep fully employed; for the rest they sub-contract to smaller hauliers and individual owner-drivers on a regular but ad hoc basis. Another reflection of market conditions is the common phenomenon of prolonged use of existing vehicles (see Mackie and Simon 1984 for more detailed discussion).

4. Impact of the Humber Bridge

In the third section of the questionnaire, comprising questions 8-10, attention focuses on the level of bridge usage by firms in the sample. Changes in vehicle fleets, employment and business attributable to the bridge are analyzed, as well as the geographical area served via it.

a) Area Served via the Humber Bridge

i) Firms located on the north bank use the Humber Bridge almost exclusively for access to South Humberside, Lincolnshire and East Anglia, in descending order of importance. The precise number and location of centres served within this area varies according to the firms' respective nature of business and scale of operation, but invariably included one or more of the major centres in South Humberside (Scunthorpe, Brigg, Killingholme, Immingham, Grimsby-Cleethorpes). Thus hauliers, particularly if specialized in container work, tend to concentrate on Immingham docks, while distribution activities are either to depots in Scunthorpe or Grimsby, or direct to outlets in a range of both large and small centres. Perhaps the most curious anomaly is the case of a major brewery's Humberside distribution depot in Hull, that for historical reasons does not deliver to Scunthorpe,

which is served instead from Sheffield.

It was shown in the section on market areas above that 12 of the 14 firms serving a purely local market are based in Hull, while the other two have depots on both banks of the estuary. For a majority of these cases the southern hinterland boundary coincides approximately with the county border. In fact 10 of the 23 north bank firms in this survey serve only part or all of South Humberside. Most of the remainder also take in one or more of Gainsborough, Caistor, Caenby Corner, Kirton-in-Lindsey, Lincoln, Louth, Skegness, Sleaford, Boston and Grantham in Lincolnshire or Newark across the Nottinghamshire border. In addition, 6 of the 23 serve one or more centres in East Anglia - Norwich, Thetford, Wisbech and most frequently Kings Lynn. One haulier even serves Cambridge via the Humber Bridge, although several other firms prefer the A-1 route there.

No particular sectoral pattern emerges, although the firms' respective market areas dictate how far south of the bridge each firm goes. What is clear for all firms, though, is that the potential area servable via the Humber Bridge is geographically restricted to a rather narrow band south - and south-eastwards of it. The western cut-off line cited by virtually all respondents is, depending on their market area, the western end of the Humber Estuary or the River Trent south thereof. With only one exception, Goole and Thorne are served via the A63/M62, although some circular tripping using the bridge in one direction does occur. Two related reasons are given for the cut-off's location: firstly the poor nature of the Lincolnshire road network south of the A15/M180 junction at Brigg, which nullifies the time savings generated by using the bridge; and secondly, the existence of a good quality north-south motorway and/or the A1 not far west of the estuary, which obviates the need to use the bridge for destinations other than those cited above. Numerous respondents ventured the opinion that, were the M11 London to Cambridge route extended northwards towards Lincoln, they would redirect the bulk of their traffic to London and the Southeast that way, with commensurate increases in Humber Bridge crossings.

ii) Given that south bank firms generally serve regional and larger, rather than purely local, markets, one might expect the Humber Bridge to improve communications with a wide range of destinations to the north. That this is not in fact the case reflects two factors similar to those cited with respect to the south bank. Firstly the road network, with the possible exception of the A1079 to York, is locally rather than nationally oriented. Most are aligned in an east-west direction, while the A163 north-eastwards to Bridlington leads to no other centre apart from Scarborough. The potential for serving national markets to the north of Humberside via the bridge is thus also restricted. A second factor which affects retail distribution, bulk haulage and services equally, is the absence of major population centres in North Humberside between greater Hull and Bridlington.

In practice therefore, 23 of the 29 south bank firms surveyed use the bridge only to one or more of the North Humberside towns of Hull, Beverley, Pocklington, Market Weighton, Driffield, Hornsea, Withernsea, Bridlington and Filey, plus Scarborough. Only three of these use the bridge to reach York, and one each to Goole and Selby. For the remainder, the least-cost route is round the estuary along the M180, M18 and A19, or else York lies outside their distribution area, being served from Leeds. Five of the 29 firms actually serve Scotland (1), the Northeast (1), Teesside (2) and Whitby (1) via the Humber Bridge. Apart from Whitby, these are invariably reached via the A1079 from Market Weighton to York, and then the A19 or A1 northwards. Of these four firms going northeast, two are located southeast of the bridge (New Holland and Grimsby) from where this represents the shortest route, while the other two are hauliers based in Scunthorpe and vicinity and use the bridge on return trips only, and then only if backhauls to the Hull area are prearranged, or drivers' hours would be exceeded by using the circumestuarine route. This behaviour is entirely consistent with the distance and cost differentials on the alternative routes (Simon 1984a: 9). One firm in Barton-upon-Humber, right at the southern end of the bridge uses it to reach the M62 for all west- or northwest- bound traffic, since the alternative of heading southwest via Scunthorpe to the M180 and M18 would entail far higher transport costs for its heavy plant.

As with north bank firms, the foregoing analysis has shown the heavily tolled Humber Bridge to be functional to south bank firms generally for only a geographically restricted set of destinations. Of these, Hull with its large population and docks which are used for grain and steel exports, is by far the most important. The small population potential of the remainder coupled with the road network probably explains the rather limited proportional increase in distribution journeys or turnover experienced north of the estuary by south bank firms. The western cut-off for using the bridge varies according to firms' locations relative to it. Thus from villages on the south bank of the estuary - the most captive market of all - the line passes due west along the M62 or north-west from Goole or Selby to York; and from Immingham/Killingholme/Grimsby it also lies from Goole or Selby to York. From the Scunthorpe area it is drawn due northwards from the confluence of the Rivers Ouse and Trent; while from Gainsborough, Lincoln and further south it follows the A614 north eastwards from Goole to Market Weighton and then either on to Bridlington or east only as far as Hornsea. This last represents the most limiting case, illustrating that the further south a firm is located, the less the opportunity cost of the A1-M18 route as opposed to the A15-Humber Bridge.

For the sample as a whole then, the Humber Bridge is significant predominantly in a local or regional context. This is due in the main to the orientation of its adjacent road system and its proximity to, but exclusion from, the motorway network ideally suited to inter-regional, rather than intraregional, traffic. In

this respect, our empirical survey has confirmed the a priori prediction made in Simon (1984a).

b) Extent of Unidirectional Bridge Use in Circular Journeys

In the preceding section it was implicitly assumed that particular destinations are served either exclusively via the bridge or round the estuary i.e. that all trips between any origin-destination pair use one route only. This is unfortunately not always the case: 17 of the sampled firms (33%) indicated that some of their journeys over the Humber Bridge are unidirectional only, rather than return trips. The other leg of such journeys follows the circumestuarine route. Six of these firms are located on the north bank and 11 on the south, thus representing 26% and 38% of the sample totals on the respective banks. Two (one on each bank) had discontinued the practice before our interviews with them due to business changes, rather than anything directly bridge related; however they have been included in this analysis for interest's sake. Unidirectional bridge use has relevance to two aspects of this project: at one level it blurs to some extent the geographic area served via the bridge, and affects the proportion of journeys/turnover generated across the bridge. At another level and flowing from this, it complicates the task of assessing the overall operators' benefit derived from the bridge, as will be attempted in a later stage of the project.

South bank firms clearly experience greater scope for making circular trips using the Humber Bridge in one direction only than north bank firms. The routes for which it is used are more variable, however. Whereas two-thirds of north bank firms simply combine Goole and the Scunthorpe area, no two south bank firms use the same route. Nevertheless 7 (64%) of the latter use the bridge one way on inter-regional journeys (either to pick up loads at Hull or, more usually, to deliver backhauls), as opposed to only 33% of north bank firms.

Such journeys are also relatively more important to south bank firms, as revealed in Table 5. With 1 exception those recorded as "unspecified" are hauliers who said that their usage fluctuates according to the availability and destination of backhauls, but that these form a very small proportion of the total.

These differences are perhaps best explained, firstly, in terms of the fact that 64% of the 11 south bank firms are hauliers (cf. 17% of the 6 north bank firms). They are more likely than other sectors to make interregional journeys in terms of the analysis in a previous section of this chapter and also to engage in backhaul trade than own account distributors. By virtue of its size and general cargo docks, Hull is the major destination for backhauls within the region. Secondly, virtually all the local area distributors in the sample are based in Hull. The bulk of their business is invariably in the major centres; as Goole is

Table 5 Unidirectional Use of the Humber Bridge as a Percentage of Total Bridge-Crossing Journeys

% of HB journeys	North bank firms		South bank firms		Total	
	no.	%	no.	%	no.	%
5%	2	33	0	0	2	12
20-25%	2	33	2	18	4	24
35-50%	0	0	3	27	3	18
75%	0	0	1	9	1	6
unspecified	2	33	5	45	7	41
<u>Total</u>	6	100	11	100	17	100

unlikely to justify a separate delivery run, it can sensibly be combined with Scunthorpe if adequate spare lorry capacity exists. This implies multi-dropping, of course. Such journeys are relatively unimportant, though, because most cross-bridge delivery runs go directly to the Grimsby-Immingham or Scunthorpe areas.

For the sample as a whole, circular journeys with one crossing of the Humber Bridge represent rather a small percentage of all bridge crossing trips, and an even smaller proportion of all journeys within the region. The circumstances under which these firms make circular journeys have been outlined above. It should be borne in mind that the sample consisted of major and regular bridge users, all based in Humberside or north Lincolnshire within a 45-mile radius of the bridge. While it is reasonable to assume these findings valid for other local firms, with the extent of their circular use of the bridge determined by clients' location and the scope for multidropping, the same is unlikely to hold for extraregional firms. For most of them the bridge provides the least-cost or quickest route to an even smaller share of their market than for local firms, and is thus relatively, and almost certainly absolutely, less important to them. Evidence from the roadside surveys presented in Simon (1984b) suggests that the bridge's value to many extraregional distribution and service firms lies in uniting two previously disparate subregions in a way making one circular trip possible rather than two separate journeys as required previously, or in making the area into a viable market for the first time. This applies equally to east-west circular routes originating and ending in Merseyside/Lancashire, and north-south circulars from London, the Southeast, Wales, Midlands or Northeast. For these reasons such journeys are unlikely to be significantly toll-elastic; by the same virtue a toll-free bridge would probably generate little additional traffic in this sub-category. The same may not be true for extraregional hauliers, since they tend not to have such discrete market areas and because their ability to compete with local firms for backhauls in each centre will be affected by toll level changes.

c) The Bridge's Impact on Fleet Size and Employment

i) Overall, the total fleet operated by 47 out of 50 firms providing valid data declined by 28 vehicles since 1981.* This change was accounted for by a growth of 24 vehicles and loss of 52 (Table 6) but involved only 16 firms, the vast majority remaining constant, albeit in some cases with greater vehicle size. Significant fleet growth was experienced by the single cleaning service, and by one of the two firms in each of fish processing, animal feeds and parcel delivery. Only one of the six wholesale distributors underwent change - a single extra vehicle. Decline was significant in energy production/distribution, totalling 8 vehicles between three of the seven firms; and especially marked in haulage. Nevertheless, the 43 vehicle decline in this sector was accounted for by only three of the sixteen firms, the rest remaining stable.

Many of these changes can be attributed directly or indirectly to the Humber Bridge's impact. Direct changes refer to the gaining or loss of markets, and indirect effects to firm reorganization (inter-depot boundary alteration, opening/closure of branches/depots) consequent upon the bridge opening. The single largest fleet change, a loss of 29 vehicles by a haulier specializing in tanker work, was attributed to loss of custom because of reorganization by the petrol majors as a result of the bridge. However the other two hauliers which pruned their fleets, by 8 and 6 vehicles respectively, felt the declining fishing industry and recession and not the bridge, to be responsible. Altogether 15 vehicle losses are ascribed to non-bridge factors. It is also important to note that a reduction of fleet size need not indicate a decline in transport capacity, if there is a commensurate shift into larger vehicles (e.g. 32.5 to 38 tonners). Thus a small petrol distributor, for example, cut his fleet by 2 tankers but in fact enhanced total tanker capacity.

ii) Employment proved significantly more responsive over the 1981-84 period than vehicle fleets, with 146 gains and 58 losses yielding a net gain of 88 jobs (cf. a loss of 28 vehicles). Once again, however, only 15 firms reported a change in staff strength, all but one being those with fleet size changes. The differences are therefore to be explained as greater employment than vehicle fleet changes - although in the same direction - within this minority of firms. In the haulage sector there was a one-one relationship between vehicle and staff (= driver) cutbacks; however in the energy distribution sector this was true for only one firm, the other two each shedding five staff but only three vehicles because of reorganization.

* Footnote

Two firms either employ none of their own vehicles, or only commenced operations once the bridge opened, thus precluding comparison.

The most dramatic discrepancies, however, occurred on the growth side, where bridge-induced expansion by the sole cleaning service in the sample generated 35 driving, cleaning and shop assistant jobs for the addition of only 4 vehicles. Similarly a parcel delivery firm bought 8 extra vehicles but created over 30 driving and depot jobs. It must, nevertheless, be pointed out that other firms in the sample are likely to have experienced personnel growth or decline for market-related reasons unconnected to the Humber Bridge, and which were therefore not reported in this survey. Only 15 of the 58 reported redundancies were unrelated to the bridge.

Overall then, opening of the Humber Bridge may be said to have induced a net loss of 13 vehicles and net gain of 103 jobs in the sample, with a further 15 vehicle and 15 job losses ascribed to recession. Inevitably there will be some inaccuracy in these figures, since it is not always possible to ascribe the observed change within firms wholly to one or other cause. But seen against the total current sample fleet size of 1275 (data on total current employment were not collected), these changes are insignificant, however great the impact on a handful of individual firms.

Geographically the balance appears to favour the north bank, with gains in both vehicles and employment, whereas the south bank lost vehicles and gained only marginally in jobs. These figures are also somewhat misleading, however, since many of the changes attributed to north bank firms, in particular, actually occurred on the south bank or by virtue of expanded marketing there. For example, the cleaning service cited above generated employment both at its Hull base and at new shops opened south of the Humber, while the Hull-based bakery in the sample also opened new, and enlarged its existing, south bank shops. The parcel delivery firm's expansion occurred only at its Hull depot, but largely by virtue of taking the south bank to its delivery area. Conversely, two Hull firms shed workers in Immingham and Killingholme (and transferred others) as part of their bridge-induced rationalization. Again, a Grimsby-based firm expanded because of the bridge, buying out a Hull operation, which accounted for 54 of the 55 new jobs ascribed to the south bank. If adjusted for these anomalies, the balance may well favour the north bank more strongly, although precise new employment data on the south bank for the Hull bakery are not available, precluding definite judgement.

Table 6 Geographical Pattern of Fleet and Employment Change

Area	Vehicles			Employment		
	gain	loss	total	gain	loss	total
N. Humberside	23	11	+12	91	13	+78
S. Humberside/Lincs.	1	41	-40	55	45	+10
Total	24	52	-28	146	58	+88

d) Level of Business Generated Across the Humber Bridge

In view of the data difficulties cited in the previous section, the difference in levels of turnover generated before and after the bridge on the opposite side of the Humber estuary by north and south bank firms respectively may provide a more reliable guide to the bridge's commercial impact. Unfortunately not all firms were able to provide this information on a uniform basis, so it has proved necessary to compute two separate sets of figures to show changes in the proportions of delivery/service journeys, and in turnover. We can hypothesize, however, that these data should show compatible trends, even though there is no unique or even constant relationship between the two variables.

i) North Humber side firms made an average of 5.5% of their journeys round the estuary before the bridge was opened in 1981 (n = 16; range = 25%-0%) a figure which had risen by 13% to 18.4% three years later (n = 16; range = 50%-4%). The mean proportion of turnover generated across the estuary rose only marginally, however, from 26% (n = 5; range = 55%-0%) to 27.6% (n = 6; range = 55%-2.8%). The reason for this discrepancy is not clear, but may be due to random factors, since several firms in each case did not increase their level of transestuarine business at all.

ii) South bank firms made an average of 11% of their journeys across the Humber estuary in early 1981 (n = 14; range = 75%-0%), which in fact fell to 8.4% by 1984 (n = 13; range = 22%-1.5%). This apparent anomaly is entirely attributable to one Lincoln-based haulier, which specialises in supplying glass for export, shifting its route to Grimsby from Hull during the intervening period because the shipping line involved switched its port of call. Without this exception, transestuarine journeys would have risen by over 3%. The average proportion of turnover generated on the north bank doubled from 8.5% in early 1981 (n = 12; range = 40%-0%) to 17.3% in 1984 (n = 12; range = 50%-3%).

Overall there has been a small but discernable increase in cross-estuary commercial activity from an average of 8.1% to 13.9% of journeys and from 13.6% to 20.7% of turnover. Nevertheless firms' respective "home" banks and other parts of the county not served via the bridge almost invariably still account for the bulk of their business as was the case with the Severn Bridge survey (Cleary and Thomas, 1973:62). The proportion of transestuarine journeys was more responsive for north bank firms than turnover, while the opposite was true for south bank firms. Their 1984 average levels are remarkably similar: 18.4% of journeys and 17.3% of turnover respectively. It is unclear however what the relationship between these two variables is. From this analysis it appears that north and south bank firms have benefited in broadly equal proportions (cf. vehicle and employment trends in the previous section). There is also no evident pattern of intersectoral differences, with the larger sectors in the sample displaying as much internal variation as exists between sectors.

e) The Impact of Recession Versus Impact of the Humber Bridge

As stated elsewhere (Simon 1984a) an important empirical methodological problem exists in the need to attempt a separation of the impact the Humber Bridge has had on firms surveyed from that of other influences, especially the recession. Three possible outcomes may be discerned conceptually, applying equally to individual firms and the sample as a whole.

(i) the bridge accelerates the recession-induced decline of a local firm, its vehicle fleet and driving staff by facilitating accessibility and hence competition from outside the area, and/or reducing the intraregional road distances to such an extent that the available work can be performed by fewer vehicles. At its most extreme, this would drive firms out of business in the long run.

(ii) the bridge opens new markets or enables greater penetration of existing markets, generating additional work and greater utilization of the vehicle fleet and reduced unit transport costs which balance the effects of recession, enabling the firm to safeguard profit margins.

(iii) the positive effects in (ii) are experienced, but the recession has no noticeable impact, so that the firm expands and prospers.

While aggregate data on employment, unemployment and production at county level may provide a clue to overall trends, no such information could be obtained from firms in the sample. Instead, management were asked whether they could distinguish the impact of the bridge from that of recession on their firm. The response rate was poor, with 23% not answering or being uncertain (Table 7). 13% answered negatively i.e. they were unable to distinguish, while 63% answered affirmatively.

Table 7 Ability to Distinguish the Impact of Recession

	No.	%
No response/uncertain	12	23
No	7	13
Yes	33	62
Total	52	100

The negative responses generally indicate that neither the bridge nor recession has had a significant effect. On the positive side, most responses fell broadly into category (ii), in that the known impact of recession could be set against the changes in market area/penetration, vehicle and driver utilization, and vehicle operating costs discussed in the preceding analysis.

Bridge related developments were seen as positive, although not always large enough to offset recession entirely. Occasionally they more than compensated. One soft drinks distributor said that the bridge enabled them to hold turnover roughly constant during some bad years for the trade. A commercial gas distributor went so far as to attribute their continued profitability in the face of a 10% decline in industrial consumption during 1981-83 to the bridge. The 8 firms placeable in category (iii) are agriculture-dependent hauliers and food processors/distributors and also some services which have not been significantly affected by the recession. These represent 24% of firms which responded positively. An extreme case is that of a parcel delivery firm which suggested that its turnover had increased markedly during the recession, because mail order business was behaving like an inferior good (i.e. purchases rise as people's incomes decline). Bridge-related cost savings and accessibility improvements thus acted cumulatively on this trend to fuel rapid growth.

Overall, close on two thirds of sampled firms suggested that the Humber Bridge has had a positive effect on their operations, especially during the current depressed economic conditions which have prevailed since its opening. By extension, one may thus deduce that these firms will be better poised to exploit market potential if and when economic revival becomes significant, thus increasing the net benefits deriving from the bridge. This would appear to be a fairly strong finding which supports the beneficial role of infrastructural improvement in regional economic development. However, if correct, it applies at best only to firms which are already regular bridge users, and says nothing about their relative importance in the region, or the proportion of all firms which they represent. Extrapolation may therefore be invalid, especially while high bridge tolls remain operative.

5. Changes in Firms' Operating Constraints

In the light of Thomas' (1983) evidence from Malaysia, particular attention was devoted during the survey to the nature of firms' operating constraints as key determinants of responsiveness to changing conditions - in this case a major road network modification in the form of the Humber Bridge. The existing constraints were discussed earlier; this section examines the extent to which the bridge has itself affected the respective constraints (question 11). The format remains the same as in the earlier section, to facilitate comparison of the 'before' and 'after' situations.

a) Journeys per day: This variable exhibited greater responsiveness than any other, the degree of change reflecting the importance of transestuarine routes and markets to the various firms as analyzed above. 23% of firms have experienced no or insignificant change in the average number of vehicle journeys per day, because

- (i) the bridge is of limited or marginal relevance to them.
- (ii) time savings generated by use of the bridge can never or seldom be utilized productively. Reasons advanced for this were that
- hauls are long and the relative saving thus insufficient to enable an additional trip within the driver's shift (some hauliers and distributors)
 - further loads or backloads are not regularly available (some hauliers)
 - waiting time at harbours and customers is at least as important as travel time savings (some hauliers and distributors).
- (iii) the Humber Bridge has permitted rerouting/rescheduling as a result of greater market penetration or extended market area. Consequently the number of vehicles routed over the bridge may have risen, rather than the number of journeys per day; or the same number of vehicles may make the same number of journeys per day as before but with additional drops and/or covering greater distances. This is true particularly for services such as parcel delivery and cleaners.

A further 12% of firms felt that they have experienced increases, but of uncertain magnitude, citing similar reasons.

Over half the respondents were able to quantify the extent of vehicle utilization increase. For 35% it has been 1/day, while 13% managed 2 or more extra journeys per day. Another 2% each have converted from one long haul plus one local delivery to two long hauls per shift, and from one long plus 1 local to 2 or 3 local journeys. In a few cases the increase refers to vehicles crossing the bridge only, not the whole fleet. Clearly, then, the most pronounced benefits in terms of greater fleet utilization have accrued to firms serving the local or regional market and with significant proportions of their business across the estuary. The most commonly cited figures are from 1 or 2/day to 3 or 4 daily between Hull and Grimsby or Scunthorpe areas; the most pronounced increase is from 1 to 4 or 5 daily between South Ferriby and North Humberside. Thus, the closer the firm and/or its major customers to the bridge and the greater the mileage differential between the two alternative routes, the greater the advantage derived from use of the bridge, provided that time savings can be productively utilized. (NB 12% of responses were inapplicable.)

b) Time for loading/unloading: As might be expected, the Humber Bridge has had virtually no impact on 'dead time' required for loading and unloading at trip origins and destinations, since it is a route improvement. Only 4% have benefited by virtue of being able to load vehicles in the evening for the following day, now that they return to base earlier. One firm (2%) has experienced quicker loading time, while another is unable to

gauge the effect because its entire fleet's vehicle size had increased. (NB. 10% of responses were inapplicable.)

c) Delivery Constraints: Most delivery constraints, such as the 'time window' during which customers accept deliveries, are also beyond the direct control of hauliers or distributors. The Humber Bridge can scarcely be expected, therefore, to have an impact on these constraints themselves, but may well influence the ability of firms to meet them. In fact only 13% of the sample have experienced greater flexibility, while another 6% have increased the number of drops per delivery run - a change which may be regarded as a consequence of improved flexibility. These firms displayed no strong sectoral clustering, being spread in haulage, fuel, cement and wholesale distribution. The primary element of flexibility is improved ability to meet delivery deadlines at factories or timed deliveries at warehouses and supermarkets/stores - shown in an earlier section to be the chief constraints. For many of these firms, however, the reduced travel time have also enabled

- i) rescheduling,
- ii) greater choice in terms of the number and location of drops in a given shift,
- iii) an additional journey or two per shift, and hence
- iv) the ability to do multiple short cross-bridge runs, add one such run to a long haul or do an extra longish haul in a shift,
- v) varying the range of products delivered on a given route or per shift

and hence, overall,

- vi) greater vehicle and driver utilization, plus enhanced turnover,
- vii) improved quality of service in terms of frequency, reliability and especially the ability to render 'fireman service' to customers running unexpectedly low on supplies. This last is of particular importance to distributors of petroleum and gas products.

Perhaps the most interesting example of greater flexibility is provided by a Hull-based distributor of newspapers and journals. Prior to the bridge's opening the (admittedly small) consignments for the south bank were taken to the harbour, unloaded onto the ferry, then reloaded onto a sister company's vehicle at New Holland pier for final distribution. Now, however, a van distributes direct to the south bank from Hull when the newspapers are ready, saving time, effort and eliminating the rigidities previously involved in meeting the ferry at either side. This, incidentally, is the only firm in our sample which made use of the Humber Ferry in pre-bridge days. HGVs could not be carried, and the cost, time rigidity and duration made it unappealing to the service sector.

The preceding paragraphs should be seen in perspective, however,

as they pertain to under 20% of respondents. Fully 69% claimed that they have experienced no change in their ability to comply with delivery constraints. (NB. 8% of responses were inapplicable.)

d) Drivers' Hours: Changes in the three elements analyzed thus far benefit firms (and primarily managers/entrepreneurs) directly. In this and the following subsection we discuss aspects of potential benefit to drivers. As will become clear, the precise distribution of these benefits depends in fact on the nature of employer-union agreements on hours and wages, and on the payment system used (see also Mackie and Simon 1984). Of the 17 firms the drivers' union membership of which is known, 8 belong solely to the TGWU (especially in fuel distribution), 1 to URTU, 3 to both, and 1 each to GMWU, NUR, USDAW, SOGAT and CONF. Not all drivers are unionized - especially the owner-driver or family firm hauliers.

81% of respondents said that there have been no changes in drivers' hours, 4% said they have changed to an unknown extent, while 2% each have experienced occasionally reduced hours, a decrease in overtime working, and reduced expenditure on overnight accommodation by virtue of drivers now being able to sleep at home. The last two of these were claimed to benefit drivers by virtue of increased amenity and less arduous hours, even though wages have fallen somewhat in the former case. (NB. 10% of responses were inapplicable.)

e) Payment System: Since the majority of firms in the sample pay a fixed or flat rate wage (see earlier section), and drivers' hours generally did not change, it is unsurprising that 58% of firms reported no changes in payment system or wages attributable to the bridge*. In 17% of cases, drivers benefit directly through a revenue, productivity or profit bonus element in their payment system. The reduced road distance and travel time enable additional journeys per shift, thereby boosting weekly vehicle revenue, productivity, and ultimately company profit. This applies particularly to haulage.

Wages in another 13% of firms have changed relatively little overall, because of contradictory movements in the productivity - and mileage-related elements. Whereas reduced route mileage affects the latter adversely, the greater revenue earning potential described in the previous paragraph compensates for it. The precise balance varies from firm to firm, and even over time within firms. This type of arrangement exists in haulage, fuel distribution and individual firms in several distributive sectors. Several firms reported initial driver resistance to using the bridge through concern at loss of mileage-based wages, until it became evident that productivity payments were at least compensatory.

* A few of these firms do have a bonus element in their payment system, but because the bridge is of very minor relevance to the firm, no noticeable wage impact occurs.

The changes induced under both the above-mentioned payment systems imply that time savings are being productively utilized most or all of the time. The potential for earning revenue-related bonuses is increased by the fact that many hauliers, fuel and bulk commodity distributors calculate journey time on the basis of outdated union-agreed speed allocations, as discussed earlier. An extra journey per shift thus enables the driver to be paid for more hours than actually worked and score through an increased bonus.

Only one firm (2%) reported that the bridge has effectively reduced some bonus payments, and although drivers had objected, they gradually accepted the change. Overall then, the wages of drivers in most firms have not been affected by use of the Humber Bridge, although a significant minority have actually or potentially benefited. (NB. 10% of responses were inapplicable.)

6. Firms' Evaluation of the Bridge's Impact

An important element of the survey was to ascertain how management themselves perceive the bridge and its impact on their firms. This section covering questions 13, 15 and 16 (a) and (b) is therefore inherently more speculative and less readily quantifiable, but no less relevant. An attempt has been made to categorize responses as accurately as possible, although the task was complicated by a frequent absence of ranking in multiple responses. Several questions were designed as 'controls' to verify or expand upon replies to earlier sections. In a few cases this exposed inconsistencies which could be pursued with interviewees.

a) Cost Studies on the Advantages of Bridge Use

When asked whether they had consciously evaluated the relative merits of using the Humber Bridge, and if so for which routes, 42% replied negatively, feeling the advantages to be self-evident for their operations. A further 12% - depots of national or multinational concerns - knew that costing studies had been carried out by their head offices, often in the context of envisaged rationalization, but did not have the results in their possession and could not describe the methodology used. Forty six per cent of the sample had conducted some analysis locally. Most frequently this was a reasonably simple exercise comparing the distance-based times and especially operating costs over the bridge and around the estuary for one or more routes and to determine a boundary range for bridge usage. Two firms actually conducted experiments, using the respective routes on consecutive days or with different vehicles on the same day, while a third firm applies a rule of thumb that the bridge is used if at least 10 operating miles can thereby be saved.

These analyses invariably showed significant distance and hence driving time reductions on the major Humber side and N. Lincolnshire routes, but the overall results depended strongly on

the measure of cost used. Variable (direct) operating cost i.e. petrol/diesel cost only was commonly referred to during interviews. Nevertheless there were frequent responses that such savings are cancelled out by the high bridge toll, but that the time savings are important and productively usable, thus justifying use of the bridge. This would imply that the value of time has actually been taken into account in their decision-making, in terms of whether the time can be productively used. In affirmative cases, the value of time saved is the net additional revenue earned during that time. No uniform value can thus be put on it for all firms; hence the need to standardize our calculations by use of data including depreciation and wage elements. Some firms unable to use time savings productively do appear to compare toll charges with direct operating cost only in deciding on bridge use. This implies a time valuation of zero. The behavioural assumptions underlying current DTP appraisal methodology would thus seem to be empirically valid, at least in part. This is an important finding, the implications of which will be returned to in a later paper.

When firms use overall operating cost (i.e. including wear-and-tear, depreciation and a wage element) in their calculations, marked savings accrue through use of the bridge. All respondents rated such costs at between 63p and £1 per mile, although 75p-£1 was the common range, depending on vehicle size and operating conditions. In the main they compare favourably with current data cited in 'Motor Transport'.

Theoretically, therefore, geographical cut-off lines determined with full operating costs should encompass considerably wider areas than those derived with direct variable cost only. This often does not appear to be the case in practice, probably because

i) firms known to use full cost, notably in the fuel distribution industry, have their service boundaries determined by national HQ as equicost lines between depots. There may be adjustment lags or institutional rigidities (including trade union agreements) hindering boundary changes;

ii) the Trent and Ouse Rivers form convenient geographical boundaries, with no significant population concentrations nearby except York and Selby, which are equally well served by either route from South Humberside in terms of distance, so that the toll effectively puts them outside the cut-off line for bridge use;

iii) most crucially of all, the road network and road quality, as already discussed, strictly limit the range of destinations for which distance and hence time savings are realizable via the bridge.

Some examples illustrate the nature of savings as perceived and realized by firms.

i) A brewery distribution fleet of 6 flatbed lorries serving a fixed geographical area (i.e. Humberside county except the Bridlington area and Scunthorpe) from Hull, experienced a 37.5% decline in total mileage travelled p.a., not withstanding increased market penetration on South Humberside.

ii) Using cost rates supplied in 'Motor Transport', one Hull-based producer using both tankers and rigid flatbeds derived the following comparative data for different vehicle classes on the Hull-Grimsby route (Table 8).

A single journey over the bridge thus saves 60 miles and 1½ hours, reducing the total costs by £47.91, £53.69, and £73.04 and the cost per tonne on full loads by £4.79, £3.84 and £4.06 for 10, 14 and 18 tonners respectively. For a return trip the magnitudes are simply doubled. As would be expected, the unit cost via both routes is highest, and the unit cost saving through use of the bridge thus greatest, for the smallest vehicle category, although the aggregate savings are greatest for the largest class.

Table 8 Cost Comparison of Alternative Hull-Grimsby Routes

<u>vehicle class and route</u>	<u>distance (miles)</u>	<u>time (hours)</u>	<u>cost/mile (pence)</u>	<u>bridge toll (£)</u>	<u>tot. cost (single) (£)</u>	<u>cost/ tonne* (£)</u>
<u>2-axle (10t uw)</u>						
estuary	80	2.5	87.35	-	69.88	6.99
bridge	20	1	87.35	4.50	21.97	2.20
<u>3-axle (14t uw)</u>						
estuary	80	2.5	99.49	-	79.59	5.69
bridge	20	1	99.49	6.00	25.90	1.85
<u>4-axle (18t uw)</u>						
estuary	80	2.5	134.22	-	107.38	5.97
bridge	20	1	134.22	7.50	34.34	1.91

* assuming full loads

iii) A Grimsby-based haulier using articulated box semitrailers calculated that Hull was 81 miles away before the bridge, but only 32 now, a reduction of 49. On a return trip diesel fuel worth £10 is thus saved and overall costs cut by 30-35%. (If diesel is costed at £1.34 per gallon, £10 represents 7.46 gallons, implying that consumption is 13.14 mpg. This seems rather low, however).

iv) Another Grimsby-based haulier works on a 50 mile reduction

one way, yielding a 6 gallon fuel saving worth roughly £8. (This yields £1.33 per gallon). This seems more accurate, suggesting 8.33 mpg consumption.

v) A south bank cement producer calculated the distance to Hull via Goole as 64 miles, and via the bridge as 13 miles, a 51 mile saving. Using a vehicle operating cost figure (excluding labour) of 86p/mile for 24-30 tonners, a round trip over the bridge reduced the cost by £72, and journey time by 3 hours 52 minutes.

It is thus clear that when true operating cost data are used, significant savings are made on the Humber Bridge routes between the major centres in Humberside, even allowing for overstatement of the mileage difference or understatement of fuel consumption. The savings cited above are net of tolls, implying that even such high tolls as exist on the Humber Bridge do not capture a major proportion of consumer surplus accruing to existing users on these routes. They do, however, reduce the destinations for which use of the bridge is profitable, as explained above.

b) The Bridge's Main Effect

This subsection combines general comments from question 16 with significant elements derived from responses to the previous section. Undoubtedly the most important factor to virtually all firms has been the value of time saved and consequent increases in vehicle utilization or revenue earnings. While operating characteristics prevent productive utilization of this saving or preclude increased business for a minority of firms, they at least acknowledge a time and operating cost reduction on existing journeys through using the bridge. Only five firms felt the bridge's impact to be negligible or non-existent, and of these one initially made heavy use of the bridge until the shipping line to which they make deliveries switched operations from Hull to Grimsby; while another made little use of it until major reorganization in March 1984.

On the positive side, 22 firms have increased their market penetration, 13 their market area, 9 reorganized their operating structures with opening or more usually closure of a depot, and shifts in interdepot boundaries, while 3 have switched the ports they serve. One firm even claimed that the bridge-induced cost savings enabled it to remain profitable during the 2 very poor operating years of 1981/2 and 1982/3.

c) Effect of Hypothetical Bridge Closure

As a control, firms were asked hypothetically how they would be affected by destruction or long term closure of the Humber Bridge. Their responses tallied in most cases with the degree of change in their operations induced by the bridge, although a few firms gave apparently contradictory responses. The most vulnerable firms are clearly those which have reorganized their operations to the extent of closing depots on one bank and

altering depot service areas, as well as those serving a purely local or perhaps regional market with a significant share of trade across the estuary (see earlier sections). This is true of many sectors, but particularly services (parcel delivery, ships chandlers, cleaners) distributors of fuel, dairy produce, bread, beer and soft drinks, and some wholesalers.

Table 9 sets out the main categories of response: nine firms gave two answers, and one gave three.

Almost 21% of responses suggested that bridge closure would have little impact. Most of these were firms with little business on the opposite bank, although several with fairly significant cross-bridge traffic felt that they had sufficient slack in their present fleet operations to enable round-estuary rerouting without affecting the viability or level of business noticeably. These included firms in the haulage, bulk distribution, cement and construction industries.

The same proportion said that they would have to raise their haulage rates/delivery prices, with a possible or certain loss of

Table 9 Likely Impact of Humber Bridge Collapse/Closure

Response	No.	%
1. little or no effect: go round	13	20.6
2. subcontract some/all opposite bank	8	12.7
3. raise rates; lose some business; possibly cut fleet	13	20.6
4. increase fleet and/or absorb higher costs	13	20.6
5. reorganize boundaries and/or no. of depots	8	12.7
6. back to pre-bridge situation	7	11.1
7. serious impact - unspecified response	1	1.5
Total	63	99.8

at least a portion of present business across the estuary, hence possibly necessitating a cut in their fleet size. Another 21% said they would need to increase their fleet in order to maintain their present level of business, and/or that they would have to absorb increased transport costs because any rate increase would render them uncompetitive with rivals across the estuary.

Thirteen percent of respondents felt, however, that it would be preferable to subcontract some or all operations on the other bank rather than lose business, and that this option was likely to be cheaper than investing in additional vehicles themselves. One firm, indeed, indicated that such a move would enable cutting their present fleet. This is consistent with the growing trend, mentioned in the earlier section on vehicle fleet sizes, to own only that number of vehicles certain to be fully employed, while subcontracting the seasonal or initial post-recession

fluctuations above that level.

Another thirteen per cent, representing the most vulnerable sectors as cited above, would have to alter inter-depot boundaries, switch some products to other depots in part of their present market areas, or (re-)open new (sub-)depots on the other bank. Such reorganization would prove extremely costly, and it should be noted that this group is not totally synonymous with that which closed one depot once the bridge opened. Although several firms do occur in both groups, two which had closed underutilized facilities said that they would definitely NOT reopen them.

Eleven per cent of responses merely indicated that they would revert to the pre-bridge situation. At first sight this may seem to imply these firms not to have made major bridge related adjustments, but this is an oversimplification. This category does embrace several firms which have generated cross-estuary business, but have adequate slack to cope, or would resume overnight journeys. Only one south bank haulier felt they might actually be worse off than before, because the ships to which they supply grain for export now use Hull rather than Gunnes wharves.

In conclusion, therefore, it has been shown that the likely impact of bridge collapse would depend on the level of cross-estuary business built up as well as firms' respective operating constraints/characteristics, most notably the degree of slack inherent in their present fleet operations. Relatively high slack exists where business levels and routes are variable, as in sections of the haulage and bulk distribution industries; where waiting time at harbours and customers (e.g. for quality control) forms a high proportion of total journey time, or where the bridge-induced time savings were insufficient to permit additional journeys within drivers' shifts. Firms serving a predominantly local market would also be the most vulnerable.

Table 10 Value of the Humber Bridge

Category	<u>To Own Firm</u>		<u>To Other Firms</u>	
	no.	%	no.	%
great	18	34.6	11	21.2
moderate	18	34.6	17	32.7
small	15	28.6	7	13.5
none	-	-	-	-
unknown/missing	1	1.9	17	32.7
Total	52	99.7	52	100.1

d) Value of the Humber Bridge

Firms were asked, in summary, how great they felt the Humber

Bridge's value to be for their firm, and others in the area. Responses to the former were remarkably evenly divided between the three major categories of 'great', 'moderate' and 'small' (Table 10). Only four cases within the 'small' category claimed its value to be minimal. At the other extreme were comments such as "The Bridge was made for us" or "It's the finest thing since sliced bread". These responses reflect the more detailed impacts as analyzed in the foregoing sections, and do not warrant additional discussion.

Nearly thirty three per cent of firms did not know whether, or to what extent, others had benefited from the bridge. The same proportion thought its general impact to have been moderate, 21% great and nearly 14% small. Additionally, several emphasized that local firms would have derived most benefit, while many respondents felt that, whatever the actual level of benefit, the potential advantage had been reduced by the high toll charges. The toll issue is certainly contentious, and it is to a more detailed consideration thereof that we now turn.

Table 11 Firms' Responses to Toll Levels and Potential Toll Level Changes

<u>Present tolls</u> Response	No	%	<u>Effect of change in toll</u>		
			Response	No	%
Reasonable in view of the savings made	11	21	None	32	62
Beneficial and principle fair	2	4	Fall would increase our usage *	14	27
Beneficial w.r.t. savings, but principle wrong	2	4	Rise would cut usage	0	0
Too high	17	33	Fall: increase usage Rise: cut usage	3	6
Too high but the principle is fair	2	4	Other	3	6
Too high and the principle is wrong	18	35			
Total	52	101		52	101

NB * This could refer to market penetration or the range of places served.

7. Humber Bridge Toll Issues

This section (question 16c-e) focuses on the controversial issue of Humber Bridge toll charges, currently by far the highest in Great Britain. They are 50p for motor cycles, £1 for cars and vans up to 30 cwt; £2 for light goods vehicles from 30 cwt to 3 tons, and £4.50, £6 and £7.50 for 2-, 3-, and 4 or 5-axle HGV's respectively. The whole principle of tolls is currently the subject of heated public debate and investigation by a House of Commons Select Committee. These wider aspects will be dealt with more fully in a subsequent Working Paper in this series.

a) Respondents' Opinions of Current Toll Levels

Probably the most widespread consensus to emerge from this survey is the assertion by fully 72% of respondents that present toll levels are excessive. Thirty three per cent merely referred to the monetary cost; 35% also claimed that the principle underlying tolls is wrong or unfair, while only 4% felt the principle to be sound (Table 11).

Only a 29% minority of respondents had no complaint about present toll levels, saying that these were far out-weighed by the time and vehicle operating cost savings derived from use of the bridge. Of this group, 21% mentioned the actual toll level only, while 4% each also felt the underlying principle to be fair and wrong respectively. No particular sectoral clustering in these response categories is evident, although firms basing their calculations on full operating cost rather than direct variable cost only, are well represented. There is also no geographical bias in responses.

The basis of arguments that tolls are wrong in principle is that the Humber Bridge forms part of the road network, and as such should be paid for out of road fund contributions in the same manner as other roads which are not liable to tolls. HGV operators pay up to £3100 p.a. licence fee, an amount already considered excessive, and there is widespread objection to having to pay tolls - which are seen as effectively another form of tax - on top of this. Some respondents referred particularly to the regional or national stature of the bridge, feeling it part of the motorway system and hence to be paid for out of national (DTp) funds, not users and local ratepayers. One actually stated that the tolls represent an unfair local burden. Such opinions are significant in showing an awareness and understanding of the arguments advanced at the time of bridge construction about the basis of finance (see Simon 1984a).

b) Likely Impact of a Change in Toll Levels

The tolls have remained constant since the bridge opened in June 1981, with the result that in real terms their value has fallen considerably. Since the HBB set toll levels somewhat lower than the ceiling currently permitted by the relevant legislation, an

increase to compensate for inflation is possible at fairly short notice. No interviewee responses indicated an appreciation of this fact, however.

Firms were asked what the effect of a change in toll levels would be on their operations for at least two reasons:

i) to obtain some information on the putative demand curve of individual user firms (from which some aggregation might be possible) for use of the bridge;

ii) to investigate whether such demand elasticity is sector-specific or dependent on current levels of transestuarine activity.

It should be noted that the response categories in Table 11, discussed below, are not all mutually exclusive, but merely reflect interviewees' reactions to the open ended question. Notwithstanding the aforementioned sentiments on current toll levels, 62% of respondents said that their firms would be unaffected by any change in this level. They already use the bridge for all potential destinations or business under present operating constraints and economic circumstances, and derive significant savings in comparison to driving around the estuary. Their demand curves can therefore be regarded as perfectly inelastic, at least over a reasonable range. Most importantly, this range includes complete abolition of the toll. This section of the sample represents a true captive market to the bridge. Equally significant from a policy point of view, this group could not be distinguished on any of the relevant variables of location relative to the bridge, economic sector, level of bridge usage/transestuarine business, or geographical scale of operation. The complete range is represented in each case*.

27% of firms said that their use of the bridge would increase if tolls were reduced or abolished. This would represent either generation of additional business on existing routes by virtue of improved competitiveness with firms on the far bank of the estuary, or a switch to serving additional centres via the bridge instead of via present routes. The latter applies more to south bank firms, and would mean inclusion of Driffield, Bridlington and in some cases York as bridge-served centres. The likely increase in business would invariably be under 25%.

One important exception is a Hull distributor of sand, roadstone and related aggregates. Because of the products' high bulk and low unit value, the market range is effectively limited to a 20-mile radius from their depot. With present tolls, the only south bank penetration that has been possible is sale of a specialized

* It is possible, though, that these firms had not fully considered potential reorganizational opportunities if tolls were abolished. Their response would thus have reflected a lack of perceived expansion possibilities given their current pattern of work.

aggregate in Scunthorpe, since this alone could stand the tolls. If tolls were halved, south bank business would increase by 500%, and if abolished by 1000%, because competition with Lincoln-based rivals would be possible anywhere within a 20-mile radius of Hull. This was the only firm in the sample so dependent on low value to bulk products, but is nevertheless important in pointing to one commodity area for which the level of tolls is very much more significant and elasticity of demand commensurately higher, than emerges from the rest of the analysis. Perhaps further investigation is warranted.

No firms said exclusively that a rise in tolls would cause them to cut their present level of bridge use, although 6% of respondents indicated that they were sensitive either to an increase or a decrease. Their demand elasticity therefore appears relatively high. Another 4% indicated that any significant toll rise would force them to reorganize operations by establishing depots or subdepots across the estuary while 2% would close such a depot if tolls were abolished. These firms were all local operations, distributing parcels, milk and dairy produce, and petroleum products respectively, with no other depot/branch to which to reallocate services for the affected area.

c) Method of Toll Payment

Table 12 Toll Payment Systems

Method of Toll Payment	Interest in Credit Card System	
	No	%
Cash	1	1.9
Voucher	50	96.2
Both	1	1.9
Total	52	100.0

Fifty firms pay the toll by means of Humber Bridge tickets, purchased in books of 20 at a 5% discount (i.e. 20 for the price of 19), while one uses both tickets and cash. Only 1 firm uses exclusively cash (Table 12). Invariably firms prefer tickets both because of the discount and to reduce the control problems inherent in advancing drivers the necessary cash. Transport managers usually hand out just the required number of tickets for a particular journey, recording them in a log book for auditing purposes.

The Humber Bridge Board is considering introduction of a credit card system whereby cards are issued either to specific

individuals or vehicles. At their request a question was inserted to canvass respondents' views on the matter. A majority of almost 58% prefer the existing system either because of its convenience or because they envisage control problems with the issue of credit cards. Drivers might lose them if not regularly used; or use them for personal trips as well as approved journeys. Administration would also become more complex, time-consuming and hence costly. In some firms, drivers are engaged in complex journeys rather than simple round tripping, so that keeping a record of bridge crossing becomes more difficult.

On the other hand nearly 37% of interviewees responded positively to the idea, subject to assurances on the security aspect. They find it inconvenient to reach ticket purchasing points, or administration of tickets a problem. In some haulage and distribution firms drivers may be rerouted during their journey, or be diverted to collect and deliver backhauls, with the result that bridge tickets issued may not be used or no tickets are to hand for unexpected crossings. Several firms also expressed concern at rumours of a black market for tickets. About 6% of firms were uncertain about a credit card system, desiring more concrete details before offering an opinion.

8. Concluding Remarks

It is not intended to provide a comprehensive overall conclusion here: the scope and length of the questionnaire precludes this, while brief summaries appear at the end of each section. More substantive issues arising from the foregoing analysis will be discussed in a subsequent Working Paper.

Overall the response rate of firms was good and the level of detail generally very satisfactory. The major exception must be the quality of data provided on the nature of adjustment, and level of bridge use. Rather than confidentiality or inappropriate question format, we feel the cause to be that most firms have not considered the role of the bridge in any such way or degree of detail, and hence do not possess appropriate data. This was not unexpected; nevertheless it has important implications for the degree of quantification and sophistication in calculating the bridge's net benefit to operators that will be possible in the final phase of the project. This problem will be addressed elsewhere.

Finally, it should be emphasized that, while we feel the sample to be representative of regular bridge using firms, this is not true for all operators. The results presented here thus reflect the upper levels of past and present responsiveness to the bridge's opening under existing tolls. Current non-users may in fact prove more responsive to changes in the level of tolls. Allowance for these factors will also have to be made in calculating aggregate operator benefits.

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Date:

HUMBER BRIDGE USERS' QUESTIONNAIRE

1. Firm's full name and address
 (incl. person seen)

2. What is your firm's chief activity (SIC classification)? [][][][]

3. On what basis do you operate? 1) own account only 2) own account mainly []
 3) hire/reward only 4) hire/reward mainly

4. Could you give me a breakdown of your present vehicle fleet?

pickup van flatbed box tanker open artic - flatbed artic box artic tanker artic open misce

Weight Class	1				2				3				4				5				6				7				8				9				10				11
	2	3	4	5	2	3	4	5	2	3	4	5	2	3	4	5	2	3	4	5	2	3	4	5	2	3	4	5	2	3	4	5	2	3	4	5					
0-3½																																									
3½-7																																									
7-12																																									
12-16																																									
16-20																																									
20-24																																									
24-28																																									
28-32½																																									
32½-38																																									

5. What jobs, if any, do your drivers perform? (e.g. loading/unloading, vehicle maintenance, repping, sales, service). If there is variation, what proportion only drive? TOTAL: _____

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In order to understand the Humber Bridge's impact on your firms's operations it would be very helpful if we could get some idea of how you manage the vehicle fleet, and schedule routes, journeys, etc. (What the major determinants and patterns are).

6. For what tasks (commodities, routes) do you use the different vehicle types? How are jobs allocated /vehicles scheduled?

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(ii)

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Are these regular? If marked seasonal variation exists, indicate different seasons' activities with letters SU, A, W, SP. If not regular at all, indicate types of work/commodities carried w.r.t. vehicle types. What degree of variability exists?

7. Elements determining your overall scheduling possibilities:

(a) Number of journeys per day made by respective vehicle types in your fleet (average daily trip rate; ratio of bridge crossings to total trips) Do drivers or managers determine the actual routeing?

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(b) How much time do you allow for loading and unloading at either end?

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(c) Are there specific times at or between which loading and delivery must take place? Mention particular commodities and places. How much of a constraint is this to vehicle utilization?

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(d) What hours do drivers work?
Is this fixed by agreement with them, the unions, or national/
EEC requirement? How is the amount of work which drivers can do
per shift determined?

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(e) On what basis are your drivers paid? Fixed wage, hourly, mileage-
related? Productivity -related over a basic?

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(f) How much of your work is on fixed on regular contract/schedule?
So, what degree of flexibility is there in planning trips and
varying commodities carried?
How much advance notice do you require of load type and quantity
and destination? To what extent do you use sub-contractors,- e.g.
to cover peak periods?

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Other relevant issues

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8. (a) To what extent has the opening of the Humber Bridge affected your operations? Include details of vehicle fleet.

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(b) Which journeys (destinations, vehicle types, commodities) involve crossing the Humber Bridge? For which destinations is the bridge always used; for which only sometimes (use map)? Indicate frequency of use and criteria for deciding non-regular use.

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(c) Can you distinguish the impact of the bridge from that of the recession on your firm? How?

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9. (a) What proportion of your turnover ^{or vehicle journeys} is generated across the estuary?

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(b) What proportion of your turnover ^{or vehicle journeys} was generated on the other side of the estuary before mid-1981? [^]

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10. What was the nature of this business? Give details of destinations, vehicle type used, commodities carried and frequency.

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11. Have the decreased time and distance because of the bridge enabled you to alter your schedules, increase vehicle utilisation or rationalize/expand operations? How? It may be helpful to answer this in terms of the changes in scheduling elements we discussed in question 7.

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(a) journeys/day? Sufficient time savings to utilise effectively?

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(b) turn around time (loading/unloading)

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(c) time window (arrival/departure constraints). Can more trips be made within them?

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(d) drivers' hours

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(e) payment system. If piecework or distance-related, how is the reduction reflected in wages? Change in payment system; proportionally reduced wages; inflexibility; stepped reduction spread over period of years? Reaction of drivers?

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(f) regularity/scheduling of work? Have changes in market or catchment area affected volume of trade, and hence rationalization, expansion, nature of work?

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12. What scale of time/cost saving would have been necessary for effective utilisation? What do you consider to be the main rigidities in your operations?

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13. Have you studied the impact of these savings on transport costs? How did/would you evaluate this, and what findings did/would you arrive at?

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Can you distinguish the following cost elements?

Variable costs {	(i) Fuel and oil
	(ii) Tyres
	(iii) Maintenance (inc. brake wear, etc.)

(iv) Depreciation? How do you budget for this item?

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(v) Vehicle capital costs (vehicle replacement frequency, no., size, type)

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14. (a) What proportion of total operating costs are accounted for by transport costs?

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(b) Any change since before the bridge opened?

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(c) How do you minimise this cost element? What degree of change in total costs would you require in order to re-evaluate your schedule and/or current operations?

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15. If the bridge were to collapse tomorrow, how would your operations be affected?

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16. How do you feel about the bridge?

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(a) Value to firm

(b) Value to other firms?

(c) Cost and toll levels to you?

(d) How would a change in toll levels affect your use of the bridge, and what degree of toll change would be necessary? Do you accept the principle of toll levies on roads/bridges to repay capital costs?

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(e)(i) Do you pay the toll in cash or by voucher?

(ii) Would you prefer to pay full price by credit card
or continue using discounted vouchers?