

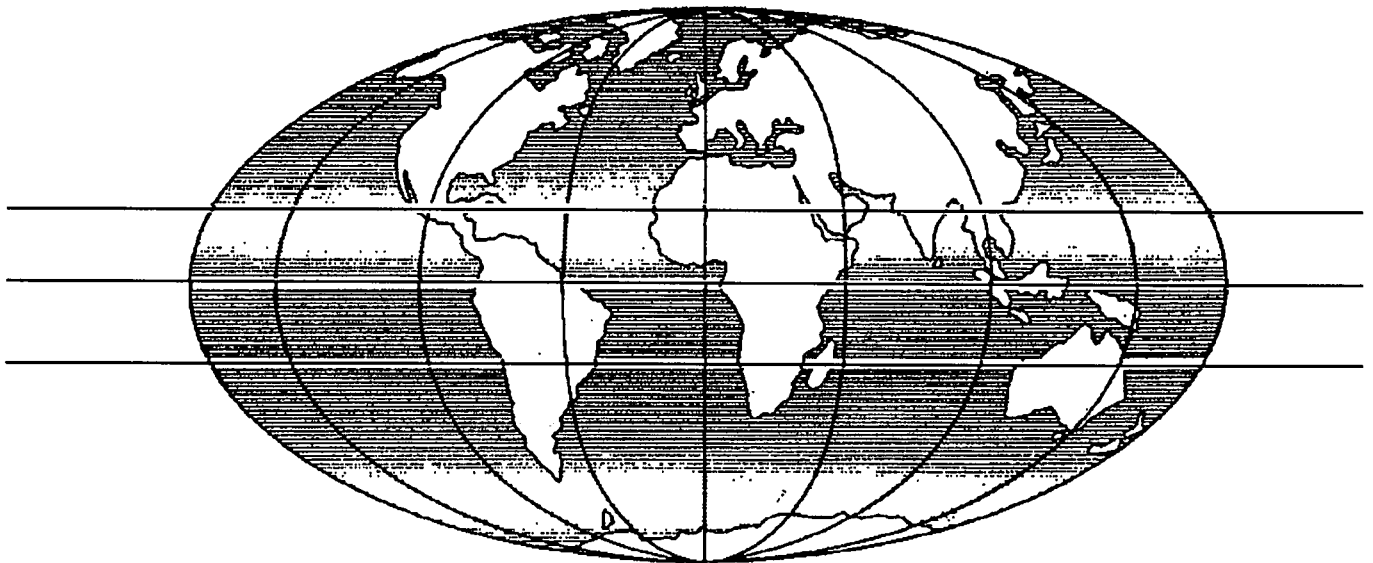


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by **T C Mbara and D A C Maunder**



**Overseas Centre
Transport Research Laboratory
Crowthorne Berkshire United Kingdom**

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**THE EFFECT OF REGULAR FARE INCREASES
ON STAGE BUS PATRONAGE IN HARARE, ZIMBABWE**

Tatenda C Mbara

Department of Rural and Urban Planning, University of Zimbabwe
P O Box MP 167 Mount Pleasant, Harare, Zimbabwe
TEL: 263-4-303211 FAX: 263-4-333407

David A C Maunder

Overseas Resource Centre, Transport Research Laboratory
Crowthorne, Berkshire, UK.
TEL: 44-344-773131 FAX: 44-344-770719

ABSTRACT

Following an extensive period of irregular but low fare increases the Government of Zimbabwe sanctioned regular and extensive fare increases commencing November 1991 for local stage bus services in urban areas of Zimbabwe.

The objective of the paper is to assess how these regular fare increases have affected demand for local stage bus services in Harare the capital of Zimbabwe. The paper also examines the effect on socio-economic aspects such as travel behaviour and expenditures on public transport.

The paper uses data generated during 1990-1992 by a study team comprising personnel of the Zimbabwe Department of Physical Planning's Urban Transport Unit, the (UK) Transport Research Laboratory and the University of Zimbabwe's Department of Rural and Urban Planning.

1. INTRODUCTION

Throughout the world, the revenue needed to sustain an urban public transport system either in the form of fares revenue or from a combination of both fares revenue plus subsidy continues to be an intensively debated subject by public transport operators, policy makers and academics. Various opinions have been expressed and while some favour full cost recovery via the fare box (World Bank 1986), others have argued for low fares in the hope that these will benefit the community in general and the urban poor in particular (Srinivasan *et al* (1983), Cameron *et al*, (1986), Bhau (1989). The latter situation arguably leads to services needing to be subsidized on social welfare criteria. However, Armstrong-Wright *et al* (1987) argue that "subsidies cannot keep up with demand, that standards deteriorate and expansion is stunted" and thus the urban poor are further deprived because they cannot afford to travel on more expensive modes. Thus Armstrong-Wright *et al* (1987) conclude "the urban poor are likely to be better served by steps to improve financial viability and efficiency than by keeping fares artificially low."

In situations which require funding of public transport provision solely through fare revenues, decisions have to be made to adjust the fares from time to time in order to raise the required revenue needed to sustain and maintain the public transport service.

In Harare, Zimbabwe following an extensive period of irregular but low fare increases, the Government of Zimbabwe sanctioned regular and extensive public transport fare increases commencing November 1991. The objective of this paper is to assess how these fare increases have affected the level of patronage for local stage bus services in Harare. In addition, the paper also examines the impact on travel behaviour and expenditure on public transport.

Clearly it is difficult to isolate the effect of just one factor (such as a fare increase) on bus patronage. Situations differ between time periods and this is undoubtedly true in Zimbabwe which has suffered from the worst drought in living memory during 1991-1992; in addition, the Government has been implementing an Economic Structural Adjustment Programme which is increasingly affecting economic activities and employment. Thus job losses and short time working are increasingly evident in the economy. There has also been a marked urban drift of population from the rural areas where extensive economic hardships have been endured. Obviously both non fare factors (climatic and economic), coupled with a high rate of inflation (equal to 58 percent during 1991/92, are likely to have had a substantial effect on bus patronage and travel patterns in urban areas. Although it is impossible to isolate such effects the authors are confident that their findings generally result from the effects of frequent fare increases notwithstanding the changes that have taken place in both the urban and national economies.

2. CITY CHARACTERISTICS

Harare is the capital and principal administrative and industrial city of Zimbabwe. Zimbabwe (formerly Rhodesia) is bordered by Zambia in the North, Botswana in the West and South Africa and Mozambique in the south and east respectively. Figures 1 and 2 show the location of Zimbabwe and Harare. Harare, and Chitungwiza, a dormitory town located some 25 km to the south, constitute Greater Harare. Since 1982 the population

of Greater Harare has grown by an average of 8.0 percent annually. The current population of Greater Harare is estimated at 1.5 million.

The public transport system in the city comprises buses (both conventional and minibuses) operated under an exclusive Franchise Agreement by the Zimbabwe United Passenger Company (ZUPCO); meter taxis; and "emergency taxis" (an informal mode of transport which was granted official but temporary recognition in December 1982 to augment the stage bus service). Emergency taxis are legally licensed to carry a maximum of seven passengers on approved routes. Recently, however, large numbers of vehicles (cars and minibuses) are operating illegally as emergency taxis ferrying passengers throughout Greater Harare.

With the growth in both legal and illegal emergency taxi provision and usage the percentage of trips made by the mode as of June 1993 had increased to 18 percent from 9 percent a year earlier as illustrated in Table 1.

T A B L E 1

MODAL SPLIT (percentage)

YEAR	Stage bus	Emergency taxi	Meter taxi	Motor car & Cycle	Cycle	Walk	Other
1988	18	7	0.5	30	1.5	42	1
1991	24	10	1	16	1	45	3
1992	31	9	1	17	5	36	1
1993	23	18	1	16	3	39	0

SOURCE: TRL/DPP/UZ Household surveys, 1988-93.

The use of motor-cycles and cars has approximately halved since 1988 as their operating costs have increased, whilst the stage bus increased in importance until April 1992 since when it has diminished to 1991 levels. Clearly, as the stage bus has declined in importance there has been a consequential increase in trips made by emergency taxis. Evidence of declining use of ZUPCO stage bus services and increased use of emergency taxis is provided in a subsequent section which discusses the results of a passenger attitude survey on modal preference. However, despite the recent decline, the ZUPCO stage carriage bus service continues to provide the major means of public transport in Harare. Currently the ZUPCO fleet comprises 823 buses including 716 conventional buses and 107 minibuses.

3. FARES REVISION - HISTORICAL PERSPECTIVE

Prior to 1980 the local urban stage bus transport services in Salisbury were operated by the Salisbury United Omnibus Company (SUOC) which was a subsidiary of the United Transport Overseas Services (UTOS) which in turn was a subsidiary of the United Transport Group (UTG), a United Kingdom based company. The company operated under a Franchise Agreement which was between the operator and the local authority. The Franchise Agreement gave the operator the exclusive right to operate stage carriage services in the capital. During this period, the local authority was responsible for setting

the structure and level of fares. SUOC, the authorised operator, enjoyed a guaranteed 20 percent return on capital employed as part of the Franchise Agreement. In the event that the 20 percent was not achieved, the difference was met by a subsidy from the local authority, Salisbury City Council.

In April 1980 Zimbabwe became an independent state with the capital Salisbury renamed Harare. Since then the Government has pursued a policy targeted at redressing the socio-economic imbalances which existed prior to 1980. In respect of stage carriage services a number of important decisions were made as follows:

- the cessation of subsidies in 1981, which Government principally viewed as a disincentive for management to achieve good financial results. At the same time, there was an agreement in principle to review fares annually.
- the determination of fares became the responsibility of Government and not that of the Local Authority.

Between 1980 to 1988 local bus fares in Harare were reviewed on three occasions only; 1983, 1985 and 1988, ie. a review every two and half years. Despite being profitable throughout the period (though the return on capital was declining) the level of fares approved by Government fell short of what was required for the company to invest in fleet renewal and expansion to adequately meet increasing patronage. Hence, profitability was enjoyed at the expense of an ageing fleet frequently prone to breakdown; thus unreliable service levels were offered to the travelling public especially during the off-peak period when approximately two thirds of the fleet were garaged in the depot.

In 1988, as the level of service increasingly deteriorated, Government made an important policy decision to participate directly in the provision of urban stage bus services. Government acquired a 51 percent shareholding in ZUPCO, which was established in 1985 incorporating all UTG's former passenger transport subsidiaries in the country. Government became the majority shareholder by means of a capital subscription in the form of buses. Following Government participation greater emphasis was to be placed on the acquisition of buses and spare parts to improve the public transport system which was increasingly characterised by long queues and long passenger waiting times. Fleet renewal and expansion have occurred since 1988 and spare parts have intermittently been procured principally by borrowing as ZUPCO could not raise sufficient internal finance from fare revenue to make such substantial capital investments.

Government participation in local stage bus service provision helped policy makers in appreciating the financial difficulties that ZUPCO was experiencing, particularly in respect of funding costly capital investments and the level of (unviable) fares. This is amply demonstrated by the fact that frequent fare increases have been granted since Government participation.

In 1990 ZUPCO was granted two fare increases, an average 47% and 16% increase in July and November respectively. In November 1991 another fare increase of 32% was approved and implemented. From April 1992 approval was granted by Government to increase fares by 25% every three months to try and restore financial viability. Thus the principle of full cost recovery through fare box revenue was accepted by Government. However, the July and November 1992 and February 1993 Government approved fare increases were not implemented by ZUPCO. Instead, conventional bus fares in excess of

15 km were increased in July 1992 leaving short distance routes and minibus fares unchanged. In November 1992 there was no fare increase effected for conventional buses and fares for minibuses were actually reduced by 20%. In February 1993 only fares in excess of 20 km were increased. Table 2 summarises the average across the board fare increases that have been approved and implemented since November 1991. Figures 3 and 4 depict the structure and level of fares (a combination of zonal and graduated) implemented during the same time period.

T A B L E 2

CONVENTIONAL AND MINIBUS FARE INCREASES SINCE NOVEMBER 1991

PERIOD	FARE APPROVED (percent)	FARE IMPLEMENTED (percent)
CONVENTIONAL BUS		
NOVEMBER 1991	32	32
APRIL 1992	25	25
JULY 1992	25	8
NOVEMBER 1992	25	0
FEBRUARY 1993	25	4
MINIBUS		
NOVEMBER 1991	25	25
APRIL 1992	25	25
JULY 1992	25	0
NOVEMBER 1992	25	-20
FEBRUARY 1993	25	0

Clearly in terms of policy changes the historical background on fares has shown three distinct phases;

- the period prior to 1980, when stage bus services were subsidised.
- the period between 1980 and 1988 when no subsidy was received and the fare increases approved by Government discouraged investment in fleet renewal and expansion.
- post 1988 period when ZUPCO have received regular percentage fare increases, allowing considerable fleet expansion and the scrapping of aged vehicles to be replaced by new acquisitions.

4. RESEARCH METHODOLOGY

In order to evaluate the effect of a fare increase on patronage it was decided to undertake both 'before' and 'after' studies. Five surveys were conducted as follows:

- September 1991: This was the base survey which was carried out before the November 1991 fare increase.
- March 1992: The survey became both the 'after' November 1991 fare increase as well as the 'before' April 1992 fare increase.

- June 1992: 'after' the April 1992 fare increase and the 'before' July 1992 increase.
- September 1992: 'after' the July 1992 fare increase and the 'before' November 1992 increase.
- February 1993: 'after' the November 1992 fare increase and 'before' February 1993 increase.

The data collected "before" fares were increased were analyzed and then compared with data "after" the fares had been increased. The data in all cases needed to be collected under similar conditions in order to be comparable. Thus, all the surveys were undertaken during the middle of the month and at a time when schools were open.

Data were collected during weekdays and at the week-ends from seventeen selected bus stands considered to be representative of those on all the bus routes operated by ZUPCO in Greater Harare. Table 3 shows the list of these 17 stands monitored including the "end to end" fare. Two survey officers were responsible for collecting data at each stand. One officer was required to interview a sample of passengers at the bus stand to obtain information on journey destination, number of interchanges if any, distance travelled, fare paid and the purpose of the journey. The second officer was required to observe and record all passengers boarding buses on an hourly basis from 05.30 hours to 18.30 hours, ensuring that all the operational periods of the morning peak, inter-peak and evening peak were covered. Plate 1 illustrates two survey officers monitoring passengers during one of the surveys in 1992.



Plate 1 Survey officers monitoring passengers in 1992 at one of the stands included in the survey.

TABLE 3

STANDS MONITORED IN HARARE

STAND	DESTINATION	ROUTE DIS- TANCE (KM)	FARES (cents)					
			Pre Nov '91	Nov '91	Apr '92	Jul '92	Nov '92	Feb '93
Chisipite	City (MB)	11.0	80	100	125	125	100	100
Chizhanje	City	15.5	60	90	110	115	115	115
Dzivaresekwa 3	City	16.4	65	95	110	115	115	115
Glen View 2	City*	16.9	60	85	110	115	115	115
Glen Norah A2	City*	16.0	60	85	110	115	115	115
Kuwadzana 1	City	16.4	60	85	110	115	115	115
Makoni Shops	City	28.1	90	100	125	150	150	170
Market Square	Mazowe (New)	30.6	85	100	125	150	150	170
Market Square	Domboshawa	35.4	85	100	125	150	150	170
Mbare Musika	Machipisa (MB)	8.4	80	100	125	125	100	100
Msasa	City	8.3	55	70	85	100	100	100
Seke 2	City	28.0/ 30.0	90	100	125	150	150	170
South Avenue	Highfield**	15.1	60	85	110	115	115	115
South Avenue	Mbare	3.8	40	50	60	60	60	60
St. Martin's	City	4.7	40	50	60	60	60	60
Warren Park 1	City	11.4	55	70	100	100	100	100
Zengeza 3	City	22.4	65	90	115	130	130	140

MB Minibus

* Monitored on weekdays only

** Monitored on week-end only

5. POSSIBLE IMPACTS OF A FARE INCREASE

The most likely impacts that would result from a fare increase, all other things being equal, are inter alia:

- Ridership is likely to fall, particularly if there is no corresponding increase in personal income. The magnitude of reduction would depend on whether demand is elastic (>1) or inelastic (<1). The corollary of this is that revenue would increase if demand is inelastic and fall if demand is elastic.
- There is likely to be a significant reduction on short distance trips compared to medium and long distance trips. The reason is that short distance riders can resort to walking, cycling or the emergency taxi as possible alternative modes.
- The number of discretionary journeys (ie. journeys in the category of leisure and visiting friends and relatives), which are likely to be non-essential are likely to be reduced or not made at all.

The above possible impacts are plausible "assumptions" which are likely in the event of a fare increase. Although these are likely impacts, this is not to say that results will always be consistent with such expectations. In the present study where the actual results are at variance with expectations, the authors endeavour to explain such inconsistencies.

6. RESULTS

6.1 Sample Size

Table 4 below shows the number of passengers interviewed at the 17 bus stands during each of the four surveys.

T A B L E 4

PASSENGERS INTERVIEWED

PERIOD	PASSENGERS INTERVIEWED			
	WEEKDAY	SATURDAY	SUNDAY	TOTAL
SEPTEMBER 1991	721	638	641	2000
MARCH 1992	807	632	722	2161
JUNE 1992	553	549	495	1597
SEPTEMBER 1992	648	600	569	1817
FEBRUARY 1993	597	508	465	1570
TOTAL	3326	2927	2892	9145

A total of 9 145 passengers were interviewed during the five surveys. Thirty-six percent of passengers were interviewed during the weekday, with an equal split of 32 percent interviewed on a Saturday and Sunday.

6.2 Number of Interchanges

Making an interchange reflects the existence of an intermediate stop where a passenger changes from one bus to another before reaching the desired destination. A journey which involves one or more interchanges is known as a linked journey which can be contrasted to a direct journey where a passenger does not need to change in the course of a journey.

There are extra costs associated with a linked trip which include the additional waiting time prior to boarding and the additional fare to be paid for the second segment of the journey. In cities where season tickets are used (not Harare) the latter cost ceases to be important.

Of the 9 145 passengers interviewed in the five surveys, 77 percent made a direct trip whilst 23 percent interchanged only once. Table 5 below shows the percentage of passengers interchanging by day of week.

T A B L E 5
PERCENTAGE OF PASSENGERS INTERCHANGING
BY DAY OF WEEK

SURVEY PERIOD	WEEKDAY	SATURDAY	SUNDAY	OVERALL
September 1991	28	33	32	31
March 1992	32	20	28	27
June 1992	14	20	16	17
September 1992	16	15	12	14
February 1993	10	12	12	11
TOTAL	100	100	100	100

There has been a continuous decrease in the percentage of passengers interchanging over the period. The overall decrease in the number of passengers interchanging (from 31 percent to 11 percent) is consistent with expectations as an increase in fares would make travelling more costly particularly with linked trips where each trip has to be paid for separately. From the results in Table 5 there has been a marked reduction in interchanges during the week-end. This may be explained by the fact that the majority of trips undertaken during the week-end are likely to be discretionary and therefore can be avoided.

6.3 Distance Travelled

In September 1991 the actual average distance travelled (calculated from route lengths) by passengers was 19 km. Over succeeding surveys this average fluctuated up and down between 17.5 to 18.5 km. Overall, the average distance travelled was 18.8 km with a standard deviation of 0.43 km. After each fare increase statistical tests of significance were carried out to establish whether any significant changes had occurred in distance travelled. The results of the t-tests showed that the distance travelled by passengers both 'before' and 'after' the fares were increased were not significantly different from each other.

6.4 Journey Purpose

In all the surveys conducted, the predominant trips were made for work purposes. Educational trips have more or less maintained similar levels in percentage terms before and after each fare increase. An insignificant number of educational trips were made during the week-ends as schools and most of the educational institutions are closed. The very few travellers recorded as travelling for educational purposes were most likely attending correspondence schools. A greater percentage of VRF (visiting relatives and

friends) trips were made during the week-end compared with weekdays, a result which agrees well with expectations. Table 6 illustrates the journey purpose results in the 'before' and 'after' fare increase situations.

T A B L E 6
JOURNEY PURPOSE (percentage of trips)

	WEEKDAY		WEEK-END		OVERALL	
	B	A	B	A	B	A
AFTER NOVEMBER 1991 FARE INCREASE						
Work	55	57	31	42	42	47
Education	19	14	2	2	11	8
Shopping	9	4	9	10	9	9
Leisure	4	8	16	8	10	8
VRF	13	17	42	38	28	28
TOTAL	100	100	100	100	100	100
AFTER APRIL 1992 FARE INCREASE						
Work	57	54	42	34	47	44
Education	14	14	2	2	8	8
Shopping	4	2	10	9	9	6
Leisure	8	10	8	6	8	8
VRF	17	20	38	49	28	34
TOTAL	100	100	100	100	100	100
AFTER JULY 1992 FARE INCREASE						
Work	54	59	34	38	44	48
Education	14	10	2	2	8	6
Shopping	2	10	9	6	6	8
Leisure	10	2	6	8	8	5
VRF	20	19	49	46	34	33
TOTAL	100	100	100	100	100	100
AFTER FEBRUARY 1993 FARE INCREASE						
Work	59	57	38	43	48	50
Education	10	10	2	3	6	6
Shopping	10	13	6	5	8	9
Leisure	2	3	8	9	5	6
VRF	19	17	46	40	33	29
TOTAL	100	100	100	100	100	100

NOTE: VRF - Visiting relatives and friends

B - Before

A - After

Comparing the results both before and after the fare increase of November 1991, the leisure and VRF share of trips actually increased from 4 to 8 percent and 13 to 17 percent respectively during the weekday. Both leisure and VRF share of trips have increased (a surprising result). Such an increase could be attributed to sampling error. However, during the week-end there was a reduction in both leisure and VRF share of trips from 16 to 8 percent and from 42 to 38 percent respectively. This result is expected as the demand for non-essential trips is likely to decrease with increased travel costs.

Following the April 1992 fare increase, the VRF share of trips increased (overall) from 28 to 34 percent. This result is unusual as the demand for discretionary trips would be expected to fall with rising fares.

After the July 1992 fare increase, the shopping share of trips increased considerably during weekdays while both leisure and VRF share of trips marginally decreased overall. Such a decrease is expected as most of the avoidable discretionary trips are made during the weekend. It is also instructive to note that the 'after July' fare increase survey was conducted at a time when the country was experiencing acute shortages of basic commodities like sugar and mealie-meal due to drought conditions. The substantial increase in weekday shopping trips may well be explained by these shortages which compelled people to undertake numerous shopping trips in search of scarce commodities.

Following the February 1993 fare increase, VRF share of trips decreased substantially during the week-end from 46 to 40 percent whilst overall VRF share of trips decreased from 33 to 29 percent.

6.5 Fares

The analysis carried out on passenger fares includes the interchange fare where applicable as well as single trip fares. Table 7 illustrates average fares monitored and the range of fares observed during both 'pre' and 'post' fare increase periods. Following the November 1991 increase the overall average recorded passenger fare increased from 76 to 97 cents, a 28 percent increase. This compares with the 32 percent overall fare increase (for conventional and minibus services) implemented by ZUPCO.

T A B L E 7

**AVERAGE FARES AND RANGE OF FARES OBSERVED
BOTH PRE AND POST INCREASES, 1991 AND 1992**

	Average fare paid (cents)	Range of fare observed (cents)	Statistical t-test analysis
Pre Nov 1991 Post Nov 1991	76 97	45-115 50-120	Considerable change
Pre April 1992 Post April 1992	97 128	50-120 68-154	Considerable change
Pre July 1992 Post July 1992	128 129	68-154 89-173	No change
Pre Feb 1993 Post Feb 1993	129 130	89-173 98-181	No change

After the April 1992 fare increase the average fare paid increased from 97 to 128 cents, an increase of 31 cents or 32 percent; yet the overall fare increase implemented by ZUPCO was just 25 percent (see Table 2). With the proportionately higher reductions in short distance trips, the average fare paid was more highly weighted by long distance trips after the fare increases.

The September 1992 survey which was conducted after the July increase showed that fares monitored ranged from 89 to 173 cents with an overall average of 129 cents, just one cent higher than on the previous occasion.

Conventional fares in July 1992 were increased by an average 8 percent whilst minibus fares were left unchanged. Overall, the across the board fare increase implemented by ZUPCO equated to 6 percent (both conventional and minibuses) whereas the average fare paid increased by approximately 1 percent, ie. considerably lower than the overall average increase.

In February 1993, following the average 4 percent increase in fares on long distance conventional bus routes, the average across the board fare increase implemented by ZUPCO (conventional plus minibus) equated to 2.8 percent. The observed fare paid marginally increased by 1 cent only from 129 to 130 cents. The fares monitored ranged from 98 to 181 cents.

Statistical analysis showed that the change in average fare paid in November 1991 and April 1992 was highly significant. The changes in July 1992 and February 1993 were insignificant which was hardly surprising as ZUPCO had only raised fares by an average 6 and 2.8 percent respectively.

6.6 Expenditure on Travel

Data on passengers' disposable income as well as the amount spent on public transport were collected during the four surveys. Table 8 shows the results of the weighted average individual monthly expenditures on public transport.

T A B L E 8

AVERAGE INCOME SPENT ON PUBLIC TRANSPORT (ZW\$)

SURVEY PERIOD	AMOUNT OF AVERAGE INCOME SPENT MONTHLY ON PUBLIC TRANSPORT	PERCENTAGE OF INCOME
April 1992	57	12.4
July 1992	59	13.0
Sept 1992	64	13.3
Feb 1993	72	13.0

There has been a marginal increase in the monthly average expenditure on urban public transport services. The percentage of income spent on travel also increased from April 1992 to September 1992 and then fell marginally in February 1993. The average individual monthly expenditure on public transport throughout the period was 12.9 percent. Interestingly, the September 1992 percentage expenditure on public transport remained high despite the fact that most employees were given a wage increase in July 1992.

The World Bank's recommendation for household expenditure on travel as a percentage of household income is 10 percent. This recommendation is based on results from a number of developing countries (Armstrong-Wright *et al* (1987). In Harare this norm in terms of the individual rather than the household has been exceeded on every occasion that surveys have been undertaken.

6.7 Passenger Ridership

Table 9 and Figures 5 and 6 summarise the overall actual ridership changes which occurred before and after each fare increase. Both the bar and cumulative frequency graphs depict marked reductions in ridership when fares were increased. Between September 1991 and September 1992 the overall reduction in patronage was 32.3 percent. However, there was a greater reduction in female passengers (35.7 percent) compared to males (30.3 percent), probably reflecting the likelihood that females were travelling for non essential activities and hence reduced their propensity to travel as fares increased. It is also likely that females switched to other modes such as foot or emergency taxi, to reduce travel expenditure.

TABLE 9

RIDERSHIP: BEFORE AND AFTER FARE INCREASES

STAND	BEFORE	AFTER	% CHANGE	BEFORE	AFTER	% CHANGE	BEFORE	AFTER	% CHANGE	BEFORE	AFTER	% CHANGE
	NOV. 1991	NOV. 1991		APRIL 1992	APRIL 1992		JULY 1992	JULY 1992		FEB 1993	FEB 1993	
ST. MARTIN'S - CITY	2225	2079	-6.6	2079	1378	-33.7	1378	1337	-3.0	1337	1374	2.8
SOOTH AVENUE - MBARE	3893	3173	-18.5	3173	2221	-30.0	2221	1354	-39.0	1354	950	-29.8
WARREN PARK 1 - CITY	2460	1267	-48.5	1267	1090	-14.0	1090	862	-20.9	862	1049	21.7
MSASA - CITY	1519	1106	-27.2	1106	605	-45.3	605	432	-28.6	432	656	51.9
KUWADIANA - CITY	4473	4036	-9.8	4036	3803	-5.8	3803	3266	-14.1	3266	3020	-7.5
CHITIBANJE - CITY	1321	1481	12.1	1481	1402	-5.3	1402	1022	-27.1	1022	941	-7.9
SOOTH AVENUE - HIGHFIELD	2038	1481	-27.3	1481	1083	-26.9	1083	788	-27.2	788	539	-31.6
GLEN VIEW 2 - CITY	2450	2119	-13.5	2119	2068	-2.4	2068	1900	-8.1	1900	2125	11.8
SPACEMAN - CITY	1145	1396	21.9	1396	1271	-9.0	1271	1337	5.2	1337	1296	-3.1
ZENGEJA 3 - CITY	6534	6229	-4.7	6229	4748	-23.8	4748	5168	8.8	5168	5362	3.8
DIVARESEKWA 3 - CITY	7404	6099	-17.6	6099	5469	-10.3	5469	5001	-8.6	5001	5339	6.8
MARKET SQUARE - NEW MAJORE	1187	1692	42.5	1692	1508	-10.9	1508	1464	-2.9	1464	1155	-21.1
MARKET SQUARE - DOMBOSEHAWA	4702	5541	17.8	5541	4257	-23.2	4257	4001	-6.0	4001	2913	-27.2
MAKONI SHOPS - CITY	6465	6069	-6.1	6069	5410	-10.9	5410	5145	-4.9	5145	5339	3.8
SEKE 2 - CITY	2894	3303	14.1	3303	2606	-21.1	2606	2893	11.0	2893	2581	-10.8
CHISIPITE - CITY	1669	1583	-5.2	1583	388	-75.5	388	240	-38.1	240	673	180.4
MBARE - MACHIPISA	3552	3705	4.3	3705	1553	-58.1	1553	1648	6.1	1648	2208	34.0
TOTAL	55931	52359	-6.4	52359	40860	-22.0	40860	37858	-7.3	37858	37520	-0.9
SATURDAYS	20862	18458	-11.5	18458	14853	-19.5	14853	12609	-15.1	12609	12747	1.1
SUNDAYS	14314	12232	-14.5	12232	9124	-25.4	9124	8776	-3.8	8776	8875	1.1
WEEKDAYS	20755	21669	4.4	21669	16883	-22.1	16883	16473	-2.4	16473	15898	-3.5
TOTAL	55931	52359	-6.4	52359	40860	-22.0	40860	37858	-7.3	37858	37520	-0.9
PEAK (MORNING)	9280	9853	6.2	9853	8089	-17.9	8089	8528	5.4	8528	7238	-15.1
OFF-PEAK	9817	9945	1.3	9945	7538	-24.2	7538	6539	-13.3	6539	7515	14.9
PEAK (EVENING)	1658	1871	12.8	1871	1256	-32.9	1256	1406	11.9	1406	1145	-18.6
TOTAL	20755	21669	4.4	21669	16883	-22.1	16883	16473	-2.4	16473	15898	-3.5
DISTANCE:												
0 - 5 KM		5252		5252	3599	-31.5	3599	2691	-25.2	2691	2324	-13.6
5.1 - 10 KM		6078		6078	3248	-46.6	3248	2942	-9.4	2942	3913	33.0
10.1 - 15 KM		10615		10615	8613	-18.9	8613	7531	-12.6	7531	7653	1.6
15.1 - 20 KM		7580		7580	6871	-9.4	6871	6023	-12.3	6023	6280	4.3
20.1 - 25 KM		6229		6229	4748	-23.8	4748	5168	8.8	5168	5362	3.8
25.1 - 30 KM		9372		9372	8016	-14.5	8016	8038	0.3	8038	7920	-1.5
30.1 +		7233		7233	5765	-20.3	5765	5465	-5.2	5465	4068	-25.6
TOTAL		52359		52359	40860	-22.0	40860	37858	-7.3	37858	37520	-0.9

At the 17 stands monitored, ridership fell at 11 and increased at 6 stands following the November 1991 fare increase. The overall decrease in patronage was 6.4 percent. Examples of routes which had a marked decrease in ridership following the fare increase include:

<u>ROUTE</u>		<u>PERCENTAGE DECREASE</u>
Warren Park	- City	-48
South Avenue	- Mbare	-19
Msasa	- City	-28

All three routes are short distance (less than 8 km). Clearly, passengers either resorted to walking and/or cycling or diverted to modes such as emergency taxis for such journeys.

Surprisingly the City-Mazowe and City-Domboshawa routes had an unprecedented increase in demand. It was established however that a church conference in Domboshawa and a parents/teacher association meeting in Mazowe had contributed to additional demand on these routes at the time of the survey.

Following the April 1992 fare increase, patronage fell at all the 17 bus stands with an overall decrease in patronage of 22 percent. Some of the routes which experienced a marked decline in ridership were:

<u>ROUTE</u>		<u>PERCENTAGE DECREASE</u>
Chisipite-City (minibus)		-75.5
Mbare-Machipisa (minibus)		-58.1
Msasa-City		-48.3
St. Martin's-City		-33.7

Again all the above routes are short, being less than 10 km. The minibus routes were severely affected due to competition from emergency taxis which also operate on short routes and were charging an average 25 cents less than for ZUPCO minibus services.

After the July 1992 increase patronage fell at 13 of the 17 bus stands and there was an overall decrease of 7.3 percent in patronage. Examples of routes which experienced considerable decreases in patronage include:

<u>ROUTE</u>		<u>PERCENTAGE DECREASE</u>
South Avenue-Mbare		-39.0
Chisipite-City (minibus)		-38.1
Msasa-City		-28.6
South Avenue-Highfield		-27.2
Chizhanje-City		-27.1

Despite ZUPCO minibus fares not being increased in July, patronage continued to decline but not at the same level as previously. One possible explanation could be the continuing fare differentials between ZUPCO minibus fares and emergency taxi fares for similar distances.

After the February 1993 fare increase, patronage fell at 7 of the 17 stands and there was an overall decrease of just 0.9 percent. Among the routes which had a considerable decrease were City-Domboshawa and City-Mazowe, the longest routes with the highest fares. Passengers may have reduced discretionary journeys as a result of the fare increase from \$1.50 to \$1.70 on both routes.

Considering the impact on patronage by day of week, the 'before' and 'after' November 1991 increase results show a 4.4 percent increase in ridership during the week day, and an 11.5 percent and 14.5 percent decrease during a Saturday and Sunday respectively. The 4.4 percent increase in patronage during the weekday could have been influenced by additional trips people were beginning to take in search of scarce food commodities despite fare increases.

After the April 1992 fare increase there was a 22.1 percent decrease in patronage during the weekday, 19.5 percent on a Saturday and 25.4 percent on a Sunday. In the September 1992 survey (following the July 1992 fare increase) patronage decreased by only 2.4 percent during the weekday, 15.1 percent on a Saturday and 3.8 percent on the Sunday. Following the February 1993 fare increase, marginal changes occurred; an increase of 1.1 percent during week-ends and a decrease of 3.5 percent during weekdays.

From the results discussed above, it is quite evident that there has been in general a greater passenger resistance for short trips and for discretionary journeys made either during the week-end or during off-peak periods. Most of the journeys made during these periods are discretionary and therefore likely to be non essential. Such discretionary journeys appear to be vulnerable whenever there is an increase in fares.

The long distance routes enjoyed comparatively smaller patronage decreases when compared to shorter distance routes. Long distance passengers are likely to be non-car owners and are virtually public transport captives as the emergency taxis do not operate longer distance (15km+) urban routes. Within these long distance bands, passengers are however, making fewer (long) trips for non essential social and leisure trips.

With respect to the minibuses which experienced an unprecedented reduction in patronage before November 1992, former ZUPCO minibus passengers were probably resisting the higher fare of \$1.25 when compared to the \$1.00 charged by emergency taxi operators. The fare differential was likely to be the major reason for the reduction in patronage for ZUPCO minibuses before November 1992 but in addition the service frequency was not attractive compared to that supplied by emergency taxis. After November 1992, ZUPCO decreased its minibus fares from \$1.50 and \$1.25 to \$1.25 and \$1.00 respectively. This probably explains the rapid increase in patronage on the two minibus routes. Patronage increased on the Chisipite-city and Mbare-Machipisa routes by approximately 180 and 34 percent respectively.

Although the ZUPCO conventional bus fare is 15 cents less than the "emergency taxis" fare for routes of less than 10 km, the conventional buses have however, failed to retain their share of the market following fare increases. It would appear that there is a trade-off between the cost differential and service attributes of the two modes. In addition, for passengers travelling short distances, other modes such as walking or cycling may have become more attractive.

It is evident from the results that there has been a marked continuous decline in travel which is more pronounced for week-end travel as shown by both Table 10 and Figure 7 which portray the decrease in ridership from September 1991 to February 1993.

T A B L E 10

TRENDS IN RIDERSHIP

	SEPT'91	MAR'91	JUNE'92	SEPT'92	FEB'93
SATURDAY	20862	18458	14853	12609	12747
SUNDAY	14314	12232	9124	8776	8875
WEEKDAYS*	103775	108345	84415	82365	79490
TOTAL	138951	139035	108392	103750	101112

* Adjusted to give a representative weekly total

Over the entire period (September 1991 to February 1993) Saturday and Sunday patronage has fallen by 39 and 38 percent respectively whilst the weekday patronage has declined by 23 percent. These results again emphasise the non-importance of discretionary journeys, generally undertaken during the week-ends, which are likely to be minimised when fares are increased.

6.8 Elasticity of Demand

Elasticity is the traditional method used by economists to indicate how patronage changes as a result of a change in either fares or service quality. This analysis has been confined to the fare variable alone. However, it must be borne in mind that elasticities for bus travel in the long term tend to indicate that passengers are more responsive to changes in service levels than to changes in fare (Burquhort *et al* 1981).

For the purpose of this analysis, point elasticity has been used which is defined as:

$$\frac{\text{Proportionate change in the number of passengers travelling}}{\text{Proportionate change in fares}}$$

which mathematically can be expressed as:

$$E = \frac{\Delta Q/Q}{\Delta P/P} = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q} \quad \text{Where: } E = \text{Elasticity of Demand}$$

Q = quantity, ie. passengers
P = price, ie. fare
ΔP and ΔQ = changes in fare and passengers

The calculated elasticity of demand results are as follows:

ELASTICITY

PERIOD	Week-end	Week-day	Overall
Post Nov. 1991 fare increase	-0.39	0.14	0.002
Post April 1992 fare increase	-0.88	-0.88	-0.88
Post July 1992 fare increase	-1.80	-0.40	-0.72
Post Feb. 1993 fare increase	0.39	-1.25	-0.89

The fare change used to calculate the values of elasticity is the average fare implemented by ZUPCO rather than the survey recorded fare change. The overall calculations take account of a 5-day week plus the week-end.

The low calculated values of elasticity of demand after the November 1991 fare increase indicate a lower loss in trips made despite a 32 percent average fare increase. The values of elasticity of demand for week-end, weekday and overall are less than unity (ie. less than 1), suggesting an inelastic demand which was a result of the non-availability of alternative modes particularly on medium and long distance journeys.

The April 1992 average fare increase of 25 percent (coming 6 months after the November 1991 increase) was met with considerable resistance from passengers. Although the calculated elasticity of demand in all cases (overall, week-end and weekday) are less than one, the actual values have more than doubled when compared to the 'post' November 1991 fare increase values. Clearly, a higher proportion of passengers were lost after the April 1992 fare increases. Although the conventional stage bus fare increase in April 1992 was 25 percent, they were increased by 32 percent in November 1991. Combined, this meant that the increase over the six months (November-April) was approximately 60 percent which is a considerable increase for conventional stage bus services.

In July 1992 the calculated elasticity of demand for the week-end equated to -1.80, ie. more than unity, suggesting an exceptionally high elastic demand for public transport despite the fact that fares were increased by only an overall 6 percent. This result is not unusual as most of the discretionary trips are made during the week-end period. The February 1993 2.8 percent increase in fares resulted in an overall elasticity of demand of +0.39 during the week-end, -1.25 during the weekday and an overall elasticity of -0.89. Distance and fare elasticity values have also been calculated using the data in Table 10. The distance elasticity of demand is defined as the proportionate change in ridership in a distance band as a result of a change in fare while the time period elasticity is defined as the change in ridership per weekday time period (peak, off-peak) due to a fare increase. The calculated elasticity values are shown below.

a) <u>Distance Elasticity:</u>	DISTANCE	ELASTICITY
	Short	-2.71
	Long	-0.46
b) <u>Time Period Elasticity:</u>	PERIOD	ELASTICITY
	AM peak	-1.70
	Off-peak	-1.82
	PM peak	-2.40

NOTES:

- i) Short distance equates to less than 10 km while long distance is taken as beyond 25 km. Elasticity figures illustrated have been calculated using actual fare increases in these distance bands.
- ii) Time period elasticity calculations are for the entire survey period November 1991-February 1993 whereas distance elasticity calculations are for the period after the November 1991 fare increase until February 1993.

The calculated value of long distance elasticity is less than unity. However the value of short distance elasticity is greater than unity, an indication of greater resistance by short distance riders. The results suggest that short distance riders may either walk, cycle or resort to other public transport modes such as "emergency taxis". The long distance riders are basically captives of conventional buses and hence a lower value of elasticity is observed.

In respect of time period elasticity, the results show a greater resistance to the pm peak period. This is primarily due to the fact that the fare increases have encouraged many commuters to walk back home after work (but use ZUPCO stage bus public transport for the journey to work to enable them to arrive at their place of work in time) thus minimising travel expenditure. This was evident from the comments given by the passengers interviewed.

7. PASSENGER ATTITUDE SURVEY

After the April 1992 fare increase the emergency taxi operators (who previously had increased fares every time ZUPCO fares were increased) decided to stabilise their fares. Clearly, the passenger resistance after the April 1992 fare increase cannot be explained by the fare difference alone, but also competition from other modes as evidenced by the results of a parallel passenger attitude survey conducted after the April 1992 fare increase.

This survey was conducted to establish passenger opinion on factors that influence modal choice by passengers. Tables 11 and 12 summarise the results of the survey in response to two questions related to modal preference and reasons for such preference.

T A B L E 11

PASSENGER PREFERENCE FOR A MODE OF TRANSPORT

MODE	CONVENTIONAL BUS	MINIBUS	EMERGENCY TAXI
PERCENTAGE	30.0	29.0	41.0

From the results of Table 11 the emergency taxi clearly was the most popular of the three public transport modes monitored.

T A B L E 12

PASSENGER REASONS FOR PREFERRED MODE (percentage)

REASON	CONVEN- TIONAL BUS	MINIBUS	EMERGENCY TAXI	TOTAL
SPEED	6.3	39.8	53.9	100
FREQUENCY	7.5	16.1	76.4	100
RELIABILITY	22.4	23.4	54.2	100
SAFETY	43.9	47.7	8.7	100
DRIVER FRIENDLINESS	53.8	21.8	24.4	100
COMFORT	29.0	61.4	9.6	100
FARE	43.0	5.5	51.5	100
INSURANCE	35.0	61.7	2.9	100

Table 12 shows that speed, frequency, reliability and convenience were the key modal choice reasons for the emergency taxi. In respect of fares on short routes, the emergency taxi directly competes with the minibus. Although the conventional buses charge slightly lower fares than the emergency taxis on similar distance routes, the service quality factors offered by the emergency taxi such as speed, reliability and frequency offset the fare differential, thus making the emergency taxi service very popular with passengers.

It is instructive to point out that the Government approved October 1992 fare increase (25%) was not implemented by ZUPCO, the bus company citing passenger resistance to fare increases as the reason for not increasing fares. In fact, there was a "negative" fare implementation which resulted in the reduction of minibus fares from \$1.25 to \$1.00 on distances up to 10 km and fares remaining at previous distances beyond 15 km. Thus by reducing the fare, ZUPCO acknowledged the strong passenger resistance to fare increases and the increasing competition faced from both legal and illegal emergency taxis.

8. DISCUSSION AND CONCLUSIONS

The findings from the study have shown that stage bus patronage decreased principally as

a result of fare increases. However, some of the loss in patronage has clearly been due to non-fare effects such as inflationary factors, drought and the economic recession. In addition, increasing competition from other modes has also been a factor. Most of the passenger resistance to fare increases particularly after the July 1992 fare increase was for short distance routes or journeys.

Over the entire study period the overall elasticity of demand has ranged from 0.002 to -0.89 equating to an average for all surveys combined of -0.62. In terms of distance elasticities the results highlight a substantial reduction in use of stage bus services for short journey distances whereas long distance passengers are more captive riders and have little choice other than to reduce the need to travel. Time period elasticity results indicate a greater resistance to travel or a reduction in the use of stage bus services during the off-peak and evening peak periods compared with the morning peak period. This may simply however be a reflection of the type of journey made with off-peak travel being more likely for non essential travel purposes and hence can be easily reduced. During the evening peak, many travellers walk or use alternative modes as they are not in a hurry to arrive home and therefore prefer to minimise transport expenditures.

In terms of policy implications there are lessons which can be learnt from the Harare study. Throughout the 1980's fares had been kept at a very low level. Consequently, very few buses were procured due to declining profitability. If fares had been gradually increased by small increments, such increases would have hardly been noticed by the travelling public. The large increases which commenced in November 1991 were too high to escape public notice. To try and redress a problem virtually "overnight" by huge increases in fares is an inflexible approach and likely to be met by stiff resistance by passengers who, if able to, will either look for alternative cheaper modes or not make the journey at all.

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Fig. 3 : STRUCTURE AND LEVEL OF FARES
IMPLEMENTED IN HARARE SINCE NOVEMBER
1991

CONVENTIONAL BUSES

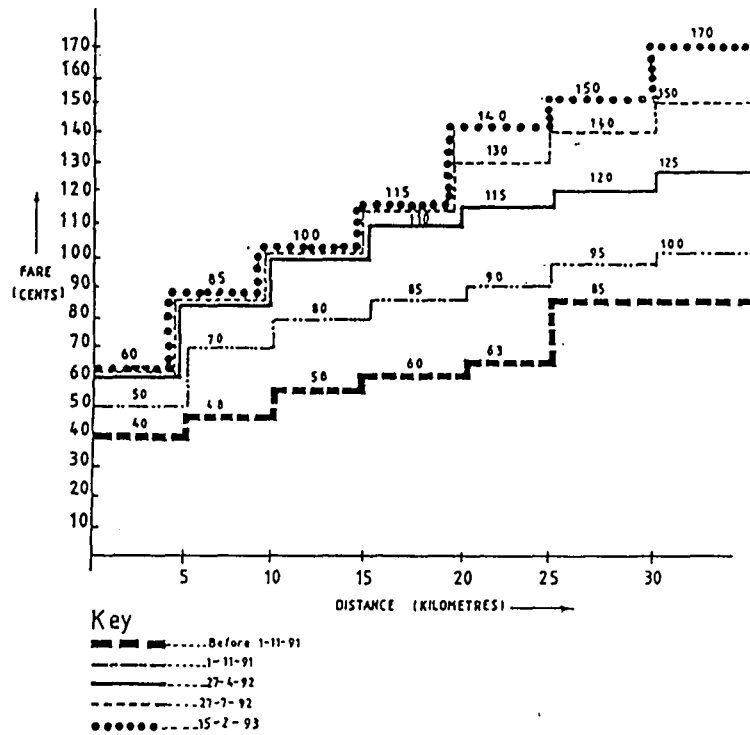


Fig. 4 : STRUCTURE AND LEVEL OF FARES
IMPLEMENTED IN HARARE SINCE NOVEMBER
1991

MINIBUSES

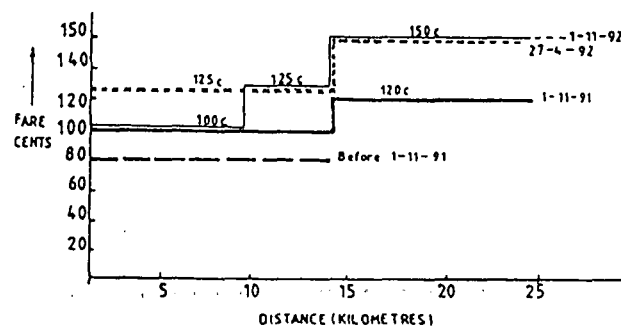


Figure 5
EFFECT OF FARE INCREASE ON RIDERSHIP

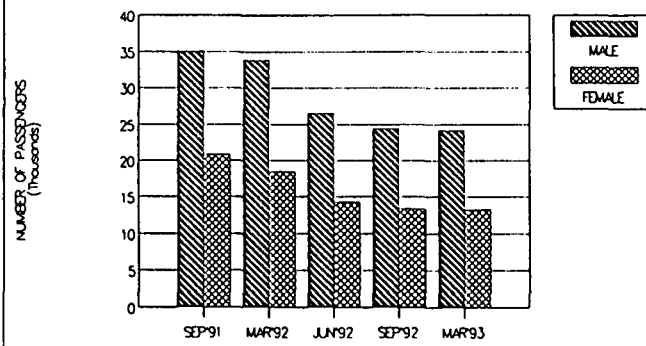


Figure 6: CUMULATIVE FREQUENCY OF TOTAL RIDERSHIP - BEFORE & AFTER INCREASE

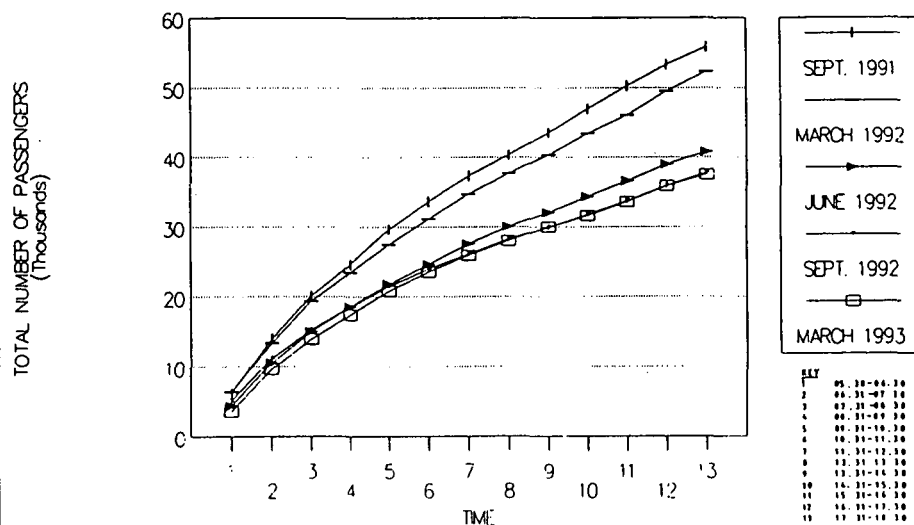


Figure 7
Trend in Ridership: Sept 1991-Feb 1993

