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GENERAL PLANNING CONSULTANT

TECHNICAL MEMORANDUM 88.3.7

IMPLEMENTATION OF UFARES AND SUBSEQUENT
RECALIBRATION OF THE MODE CHOICE MODELS

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1. INTRODUCTION

This memorandum describes the introduction of a revised transit fare calculation model, UFARE8 and the subsequent need to recalibrate the modal choice models that are at the core of the SCRTD's patronage forecast simulation program.

UFARE8, originally called FAREMTRX, is a new transit fare estimation program. Unlike the existing FARE00 and FARE80 programs, which can only report total transit fare, UFARE8 reads the transit network TNET file and traces the transit path for each trip interchange in the region and produces eight transit fare tables:

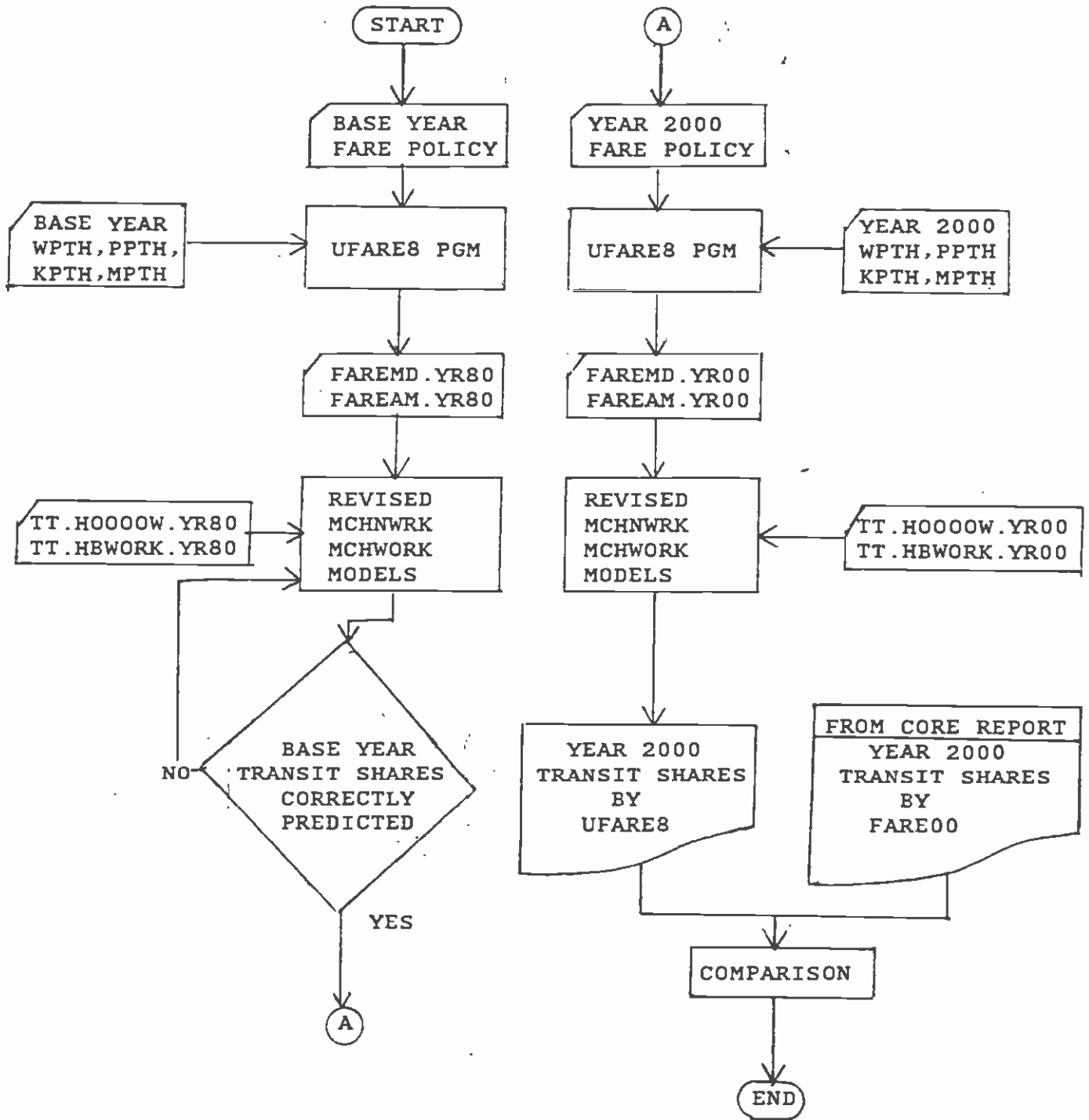
1. Total transit fare,
2. Park-and-ride lot parking cost,
3. RTD local bus fare,
4. RTD express bus fare,
5. Metro rail fare,
6. Light rail transit fare,
7. Non-RTD local bus fare, and
8. Non-RTD express bus fare.

The first table, total transit fare, is useful for predicting transit shares in the mode-choice step. The following seven tables are useful for estimating transit revenues from all RTD system components in terms of local buses, express buses, Metro Rail, and light rail. Details on the function of UFARE8 are documented in Technical Memorandum 87.3.1.

To implement UFARE8, three tasks are involved. First, the base year transit fare policy must be coded in the system input form to be fed to the UFARE8 program. Based on this input, base year fare tables then can be produced by UFARE8. Second, it was necessary to recalibrate the modal bias and the county bias parameters in the mode choice models for both work and nonwork trip purposes. After this recalibration process is completed, base year transit shares produced by the recalibrated mode choice models should replicate the locally observed transit shares by county and by modes. Only if the mode choice models correctly predict the base year mode shares, can they be applied to future year travel forecasting. Third, to insure compatibility between the newly calibrated models with the currently being applied models (i.e. FARE00) a set of comparison runs should be performed for Year 2000 horizon. It is expected that transit shares in Year 2000 produced by FARE00 should be in similar ranges to those from UFARE8 of the same fare structure. The details of this three-step process is sketched in Figure 1.

The process of recalibrating mode choice models has occurred several times in the past. Among these were a recalibration to accommodate a regional traffic analysis zone redivision from 1,325 zones to 1,628 zones, a

FIGURE 1 TASKS FOR IMPLEMENTING UFARES PROGRAM



revision to trip distribution resulting from the application of a multiple-iterative gravity model, a revision to path building criteria and revised network coding procedures.

The remainders of this memorandum are organized as follows. Section 2 presents the JCL setups and describes the input parameters for UFARE8 program. Section 3 describes the structure and recalibration process for mode choice work and non-work models. Section 4 presents the results of mode choices from alternative simulation runs. These runs include UFARE8 generated fare tables with recalibrated MCHWORK and MCHNWRK models, and FARE00 generated fare tables with current MCHWORK and MCHNWRK models.

2. JCL AND RELATED SETUPS FOR UFARE8

2.1 JCL Setup for MRP.TRNNET.CNTL(UFARE8)

The JCL setup for UFARE8 was designed to produce the input fare tables to both the mode-choice programs and the revenue estimation procedure. The setup reads MPTH, WPTH, PPTH, and KPTH files and writes on one tape three separate files: FAREMD, FAREAM, and FAREAM16. FAREMD contains eight midday fare tables as described in Section 1. FAREAM contains three total fare tables; one for walk access, one for PNR access, and one for KNR access. FAREAM16 contains 16 a.m. fare tables:

- | | | |
|---------------------|---------------------|----------------------|
| 1. wlk total, | 7. pnr park cost, | 13. knr RTD local, |
| 2. wlk RTD local, | 8. pnr RTD local, | 14. knr RTD express, |
| 3. wlk RTD express, | 9. pnr RTD express, | 15. knr RTD MR, |
| 4. wlk RTD MR, | 10. pnr RTD MR, | 16. knr RTD LR. |
| 5. wlk RTD LR, | 11. pnr RTD LR, | |
| 6. pnr total, | 12. knr total, | |

For mode choice work and nonwork process, the first table of FAREMD and all three tables in FAREAM are used. For revenue estimation, entire FAREMD and all tables in FAREAM16 are used.

The structure of the JCL setup for UFARE8 is as follows:

<u>STEP NAME</u>	<u>PROCEDURE</u>	<u>ACTIVITIES</u>	<u>INPUT/OUTPUT</u>
FAREMD	FAREMTRX	Build 8 midday fare tables	MPTH (I) &&FAREMD (O)
MDFARE	IEBGENER	Copy fare tables to tape	&&FAREMD (I) FAREMD (O)
FAREWLK	FAREMTRX	Build 8 walk access fare tables	WPTH (I) &&FAREWLK (O)
FAREPNR	FAREMTRX	Build 8 PNR access fare tables	PPTH (I) &&FAREPNR (O)
FAREKNR	FAREMTRX	Build 8 KNR access fare tables	KPTH (I) &&FAREKNR (O)
MERGEAM	UMCON	Extract the first table from each of the 3 input files	&&FAREWLK (I) &&FAREPNR (I) &&FAREKNR (I) FAREAM (O)

(...continued)

MERGE16

UMCON

Extract 16 tables from
each of the 3 input files

&&FAREWLK (I)
&&FAREPNR (I)
&&FAREKNR (I)
FAREAM16(O)

2.2 SYSIN File and Parking cost File to UFARE8

UFARE8 requires a SYSIN file describing the fare policies of various companies and various modes in the region. For calibration purpose, the fare structure observed in the base year (1982) must be coded into the file. The key parameters in this SYSIN file are presented in Table 1. Several assumptions in preparing this fare structure inputs need to be noted.

First, in the base year of FY82, the base RTD fare was set to 55 cents in 1982-dollar value. Second, the average flat fare for RTD local buses and express buses, i.e. PARAM(40) and (50), were estimated by the cash recieved from all cash boardings, including full fare, student fare and senior citizen fare etc. divided by the number of cash boardings. It was found that the average fare per boarding paid by cash is about 60% of the base fare for each year. Thus, 33.4 cents instead of 55 cents were used. Third, the fare for transfer was estimated from the weighted average of transfer passes from cash boarding and the monthly passes. In other words, each boarding with a monthly pass is always treated as a transfer boarding. It was found, based on such calculation rationale, that the average fare recieved from transfer boardings is about 23% of the base fare.

Since the calibration network FAR82VAL is an all-bus transit network, parameters related to rail modes were all irrelevant and were set to zero. It should be noted that these SYSIN parameters were somewhat different from those applied previously as descriced in Technical Memorandum 86.3.1 (pp.123). Such difference has been shown to the District and it was decided that the ones adopted in Table 1 are closer the observed situation for base year operation.

Parking costs at transit park-and-ride stations were also coded zero for the recalibration run to produce base year fare matrices for AM and midday periods. Park and ride lots applicable to the FAR82VAL network including the network node, station number, and zero-coded park costs are shown in Table 2.

TABLE 1 RECALIBRATION NETWORK FARE PARAMETERS

KEYWORD/ UPARM	CODED VALUE	(DESCRIPTION)
&INPUT		
FAREYR	= 1982	(year of dollars for fares (must be specified))
KISS	= 0=no, 1=yes	(select for kiss-and-ride paths)
&OPTION		
XLINES	= 0=no, 1=yes	(flag for printing of express route arrays)
TREE	= 41	(origin zone number of path tree (if desired))
PATH	= 41	(origin zone of path arrays (if desired))
&PARAMS		
PARAM(1)	= 100	(utps line number for mode 5 separating RTD from non-RTD routes)
PARAM(2)	= 30	(threshold speed separating mode 5 express from local service)
PARAM(3)	= 1.1	(average auto occupancy for park-and-ride trips)
PARAM(4)	= 1.0	(express mode fare factor)
PARAM(5)	= 50.01	(minimum express fare when factor is applied)
PARAM(6)	= 0.1	(grace distance for fare zone boundary crossing-mi.)
PARAM(9)	= 0.0	(rail fare calculation switch - 0=use combined rail distance, 1=use separate Metro rail and light rail distances)
PARAM(10)	= 0.0	(minimum rail fare (combined) - cents)
PARAM(11)	= 0.0	(fixed distance to which PARAM(10) applies - miles)
PARAM(12)	= 0.0	(incremental zone fare (combined) - cents)
PARAM(13)	= 0.0	(incremental zone distance (combined) - miles)
PARAM(14)	= 0.0	(maximum rail fare (combined) - cents)
PARAM(15)	= 93.3	(maximum fare for mode 5 - cents)
PARAM(16)	= 93.3	(maximum fare for mode 6 - cents)
PARAM(17)	= 93.3	(maximum fare for mode 7 - cents)
PARAM(40)	= 33.4	(mode 4-(RTD local bus) flat fare - cents)
PARAM(41)	= 33.4	(value of a transfer used to board mode 4 - cents)
PARAM(44)	= 13.0	(cost of a mode 4 - mode 4 transfer - cents)
PARAM(45)	= 13.0	(cost of a mode 4 - mode 5 transfer - cents)
PARAM(46)	= 33.4	(cost of a mode 4 - mode 6 transfer - cents)
PARAM(47)	= 33.4	(cost of a mode 4 - mode 7 transfer - cents)
PARAM(48)	= 13.0	(cost of a mode 4 - mode 8 transfer - cents)
PARAM(50)	= 33.4	(minimum fare for mode 5 (express bus) - cents)

TABLE 1 (CONTINUED) RECALIBRATION NETWORK FARE PARAMETERS

KEYWORD/ UPARM	CODED VALUE (DESCRIPTION)
PARAM(51) =	33.4 (value of a transfer used to board mode 5 - cents)
PARAM(52) =	3.0 (fixed distance to which param(50) applies - miles)
PARAM(53) =	17.1 (incremental zone fare for mode 5 - cents)
PARAM(54) =	13.0 (cost of a mode 5 - mode 4 transfer - cents)
PARAM(55) =	13.0 (cost of a mode 5 - mode 5 transfer - cents)
PARAM(56) =	33.4 (cost of a mode 5 - mode 6 transfer - cents)
PARAM(57) =	33.4 (cost of a mode 5 - mode 7 transfer - cents)
PARAM(58) =	13.0 (cost of a mode 5 - mode 8 transfer - cents)
PARAM(59) =	3.0 (incremental zone distance for mode 5 - miles)
PARAM(60) =	0.0 (minimum fare for mode 6 (Metro rail) - cents)
PARAM(61) =	0.0 (value of a transfer used to board mode 6 - cents)
PARAM(62) =	0.0 (fixed distance to which param(60) applies - miles)
PARAM(63) =	0.0 (incremental zone fare for mode 6 - cents)
PARAM(64) =	0.0 (cost of a mode 6 - mode 4 transfer - cents)
PARAM(65) =	0.0 (cost of a mode 6 - mode 5 transfer - cents)
PARAM(68) =	0.0 (cost of a mode 6 - mode 8 transfer - cents)
PARAM(69) =	0.0 (incremental zone distance for mode 5 - miles)
PARAM(70) =	0.0 (minimum fare for mode 6 (light rail) - cents)
PARAM(71) =	0.0 (value of a transfer used to board mode 7 - cents)
PARAM(72) =	0.0 (fixed distance to which param(70) applies - miles)
PARAM(73) =	0.0 (incremental zone fare for mode 7 - cents)
PARAM(74) =	0.0 (cost of a mode 7 - mode 4 transfer - cents)
PARAM(75) =	0.0 (cost of a mode 7 - mode 5 transfer - cents)
PARAM(78) =	0.0 (cost of a mode 7 - mode 8 transfer - cents)
PARAM(79) =	0.0 (incremental zone distance for mode 7 - miles)
PARAM(80) =	25.1 (mode 8 (non-RTD bus) flat fare - cents)
PARAM(81) =	25.1 (value of a transfer used to board mode 8 - cents)
PARAM(84) =	13.0 (cost of a mode 8 - mode 4 transfer - cents)
PARAM(85) =	33.4 (cost of a mode 8 - mode 5 transfer - cents)
PARAM(86) =	33.4 (cost of a mode 8 - mode 6 transfer - cents)
PARAM(87) =	33.4 (cost of a mode 8 - mode 7 transfer - cents)
PARAM(88) =	13.0 (cost of a mode 8 - mode 8 transfer - cents)

TABLE 2 PARKCOST INPUT FILE

STATION	NETWORK NODE	PARK COST	USTOS STATION NUMBER
UNION STATION	7950	0	1
VENTURA/RIVERTON	5338	0	301
FALLBROOK/CRISWELL	5620	0	302
VICTORY/TOPANGA	5626	0	303
SHIRLEY/PLUMMER	7439	0	304
ROSCOE/NOBLE	7462	0	305
BATTERY/GAFFEY	2245	0	306
HAMILTON/TORRANCE	2464	0	307
XIMENO/PCH	3186	0	308
LA MIRADA/OCASSO	3703	0	309
FREEWAY/ALONDRA	3698	0	310
ORANGETHORPE/MAGNO	3586	0	311
CITRUS/FOOTHILL	7049	0	312
BARRANCA/WORKMAN	6610	0	313
DIAMOND BAR/POMONA	6135	0	314
ALBATROSS/CASTLETON	5984	0	315
MONTE VISTA/SAN JOSE	6652	0	316
MCKINLEY/WHITE	6629	0	317
MCKINLEY/GAREY	6636	0	318
SANTA ANA/RAMONA	6563	0	319
4665 LAMPSON	3215	0	320
COLORADO/ST. JOHNS	7153	0	321
EXTRA-TO BE IDENTIFIED	3132	0	322
EXTRA-TO BE IDENTIFIED	6623	0	323
EXTRA-TO BE IDENTIFIED	6995	0	324

3. RECALIBRATION OF MODE CHOICE MODELS

3.1 Overview and Results

The mode choice procedure consists of three custom-developed models which assess home-based work, home-based other, and non-home-based modal splits for the Los Angeles area. These mode choice models predict the proportion of transit trips for a trip interchange as a function of the relative travel times and costs for the modes involved in that interchange and of household characteristics in the trip interchange production zone. The general characteristics of the models are described in Technical Memorandum 86.3.1. This section will review only the characteristics relevant to the concern of recalibration.

The mode choice model for home-based-work trips contains seven alternatives:

1. Drive alone,
2. Shared ride with two persons in car,
3. Shared ride with three or more persons in car,
4. Walk access to transit,
5. Park-and-ride drive to transit,
6. Park-and-ride driven to transit, and
7. Kiss-and-ride to transit.

For each of the seven alternative modes, an alternative-specific constant (ASC) is coded. These ASC's are used to capture the average effects due to random utilities which are not explained by the variables specified in the model. Because the mode choice model used at SCRTD is multinomial logit model, which operates on the differences of attributes among alternatives, one of the seven ASC's is not identifiable and can be set to zero for convenience. Thus, there are in fact six ASC's to be recalibrated. Additional to these six ASC's, MCHWORK program contains five additional county specific transit dummies. These county dummies are used to capture the differential modal bias among the five counties in the region. With these eleven ASC's (six modal dummies and five county dummies) it was anticipated that the MCHWORK model would produce accurate estimates of modal shares in each county. It should be noted that such anticipation can only be achieved partially. If we were to have a model which predicts all seven modal shares correctly in each of the five counties, the total number of ASC's needed would be $6 \times 5 = 30$.

The practice of model recalibration, effectively speaking, is to apply an iterative technique to search for the values of these eleven ASC's, such that the base year modal shares can be correctly produced by the model using base year data and these ASC's. To calibrate these eleven ASC's, a two-stage process was applied. In the first stage, six ASC's were calibrated such that the base year modal shares in L.A. county are

correctly predicted. Since transit riders in L.A. county represent over 90% of total regional transit patronage, the six ASC's resulted from first stage can correctly predict modal shares for over 90% of the transit users. In the second stage, the six modal dummies calibrated in previous stage are fixed. Only the transit dummies for Orange, San Bernadino, Riverside, and Ventura counties are calibrated. The purpose of the second stage is to ensure that MCHWORK model produces combined transit shares (i.e. walk, park-and-ride, and kiss-and-ride access summed together) correctly in each county. The calibrated parameters from this two stage process are tabulated in Table 3.

The mode choice model for home-based-other trips is a simple binary logit model with only two alternative modes in choice set:

1. Auto, and
2. Walk access to transit.

This model predicts the mode shares into each of the five counties separately. Setting the bias coefficient for auto mode to zero, there are only transit bias constants can be calibrated. Because there are five counties in the region, we need to calibrate five transit dummies; all can be calibrated in one stage. The resultant parameters for home-based-other model are tabulated in the first portion of Table 4.

The mode choice model for non-home-based trips is a trinomial logit model with the alternatives:

1. Auto drive alone,
2. Auto shared ride, and
3. Walk access to transit.

Because the production end of these trip makers are unidentifiable, county dummies cannot be incorporated into the model. Only two mode bias coefficients, namely drive alone and shared ride are present and to be calibrated. The resultant parameters are tabulated in the second portion of Table 4.

The calibration of all the ASC's in each of the three mode choice models are based on a simple formula suggested by McFadden (1976)

$$ASC_{i+1}^m = ASC_i^m - \ln \left(\frac{Q_i^m}{H_i^m} \right) \quad (1)$$

where

ASC_i^m = Alternative specific constant for mode m in iteration i ,

TABLE 3 ADJUSTED COEFFICIENTS IN MCHWORK MODEL

<u>MODEL CONSTANTS</u>	<u>MODEL NUMBER</u>	<u>ORIGINAL COEFFICIENTS</u>	<u>1988 FAREMTRX RECALIBRATION</u>
FIRST STAGE RECALIBRATION			
Auto Mode Bias Coefficients			
DRIVE ALONE	41	-0.2484	-0.260967
2 PERSON CARPOOL	n/a	-	-
3+ PERSON CARPOOL	42	-1.4377	-1.49489
Transit Mode Bias Coefficients			
PARK-AND-RIDE (1)	21	-0.8101	-0.98593
PARK-AND-RIDE (2+)	22	-1.0350	-1.22786
KISS-AND-RIDE	23	0.3837	0.102704
WALK	32	3.3248	2.780558
SECOND STAGE RECALIBRATION			
Transit Dummies in Each County			
Los Angeles	61	0.5140	0.5140
Orange	62	-0.1940	-1.22786
Riverside	63	0.4100	0.77772123
San Bernardino	64	0.3660	0.102704
Ventura	65	0.1074	0.43878625

Note: Recalibration of UPARM(61), transit dummy for L.A. County was unnecessary since full set of ASC's were already recalibrated in the first stage.

TABLE 4 ADJUSTED COEFFICIENTS IN MCHNWRK MODEL

<u>MODEL CONSTANTS</u>	<u>MODEL NUMBER</u>	<u>ORIGINAL COEFFICIENTS</u>	<u>1988 FAREMTRX RECALIBRATION</u>
Nonwork Model			
Transit	21	3.6274	3.6274
Los Angeles	41	-0.3475	-0.84462023
Orange	42	-0.1407	-0.77376953
Riverside	43	0.3819	0.43492656
San Bernardino	44	0.2495	-0.54012774
Ventura	45	0.3623	-0.36928664
Non-Home Based Model			
Drive Alone	87	-2.8850	-3.20931448
Shared Ride	88	-2.8130	-3.13731448

Note: Recalibration of UPARM(21), transit dummy for entire region, was unnecessary because transit dummies in each county, enabling the model correctly predict transit shares in each county, will automatically produce correct regional transit share.

Q^m_i = Predicted share for mode m in iteration i , and
 H^m = Observed share for mode m .

According to McFadden, whenever a multinomial logit model is calibrated from choice-based samples, in which the mode shares are distributed differently from the actual population shares, Equation (1) should be applied to each of the calibrated ASC's simultaneously to achieve the correct population market shares.

This formula is simpler than the one applied previously (see Technical Memorandum 86.3.1, p.p. 5-4):

$$\text{ASC}^m_{i+1} = \text{ASC}^m_i - \ln \frac{(Q^m_i / (H^m - 1))}{(H^m / (Q^m_i - 1))} \quad (2)$$

Equation (2) has been derived from the concept of incremental logit analysis. It assumes that if we were to change ASC's one at a time, then the natural logarithm term on the right hand side of (2) should be the adjustment to be made. However, since all ASC's in our model are to be adjusted simultaneously, Equation(1) would be more efficient and appropriate to apply.

3.2 Recalibration of MCHWORK Model

The all-bus network FAR82VAL, is the transit network coded for calibration purpose. The input files to MCHWORK model associated with this FAR82VAL network are:

1. MRP.FAR82VAL.AM17 ---transit time by various access modes,
2. MRP.Y80Z1628.H8 ---highway time and distance of various highway modes,
3. MRP.FAR82VAL.RECALIB.FAREAM ---transit cost by various access modes,
4. MRP.TT.HBWORK.Y80PA4.DATA ---YEAR 1980 TRIP TABLE,
5. MRP.TAZ.SCAG80B.DATA ---year 1980 socioeconomic characteristic.

The SYSIN file used to produce the above FAREAM file is tabulated in Table 1 of this memo. It is based on the fare structure charged in year 1982, in 1982 value. Consumer price index (CPI) for base fare, parking cost, fuel price, and trip makers income need to be specified to SYSIN to MCHWORK program. These CPI's together with the assumed fuel economy are tabulated in Table 5.

Tables 6 and 7 are the lotus 123 spreadsheets developed to facilitate the recalibration process. Tables 6.1 to 6.3 are the spreadsheets for first stage recalibration, estimating all mode specific dummies based on detailed mode shares in Los Angeles County. Tables 7.1 to 7.3 are the spreadsheet for second stage recalibration, estimating the county dummies based on the aggregated transit share in each county other than L.A..

The upper table in Table 6.1 shows the 1980 observed market shares by county, which are the targets we wish our recalibrated model to achieve by the end of second stage. The lower table in Table 6.1 first shows the 1980 observed market shares in L.A. County. Then the model predicted shares are entered under the observed shares. The ratio of the predicted share to the observed share are calculated and natural logarithm taken. Subsequently, the six mode dummies are adjusted and listed as the last row of the table. These adjusted dummies are then used as new ASC's for the next iteration and new modal shares are then compared with the observed shares. This feedback process continues until the ratios of predicted shares to observed shares sufficiently close to one and the adjustment to the dummies becomes insignificant.

After the fourth iteration, in the lower table of Table 6.3, we can see that the row of EST/OBS contains all the values very close to one, i.e. MCHWORK model produces observed mode shares in L.A. County with less than (0.4%) error. The needed dummy adjustments in the fourth iteration are shown in the row of $\ln(\text{EST/OBS})$, which are in the range of $-.00003$ to $.004$. These adjustments are considered sufficiently small; thus, recalibration of mode dummies stopped at the end of the fourth iteration.

TABLE 5 CONSUMER PRICE INDEX AND FUEL ECONOMY
 ASSUMED FOR CALIBRATION RUNS

BASE FARE	\$.55
YEAR VALUE	FY80
CPI	233
PARK COST	\$0.0
YEAR VALUE	FY80
CPI	233
FUEL PRICE	\$1.20
YEAR VALUE	F80
CPI	233
INCOME	--
YEAR VALUE	FY76
CPI	176
FUEL ECONOMY	17.5
(GAL/MILE)	

TABLE 6.1 SPREADSHEET FOR MCHWORK MODEL RECALIBRATION -- FIRST STAGE

HOME-BASED WORK TRIPS OBSERVATION SUMMARY

	TOTAL TRIPS	TOT PCT BY CTY	TRANSIT TRIPS	TRN SHR W/I CTY	TRN PCT BY CNTY	MODE	CHOICES	TOTAL
						DRV ALONE SR 2 SR 3+	WLK PND PNP KNR	
L.A.	4,601,414	0.653477	441,276	0.0959	0.904672			
ORANGE	1,563,268	0.222010	33,610	0.0215	0.068905			
RIVERSIDE	236,292	0.033557	3,473	0.0147	0.007121			
S.B.	330,825	0.046982	4,863	0.0147	0.009970			
VENTURA	309,628	0.043972	4,552	0.0147	0.009331			
SUM	7,041,427	1	487,774	0.069272		1 5,102,019 1,034,166 417,468 414,559 47,558 8,438 17,218 7,041,427		
SUBMODE PCT						0.7785 0.1578 0.0637 0.8499 0.0975 0.0173 0.0353 2.000000		
REGION PCT						0.7245717 0.1468688 0.059287 0.058874 0.006754 0.001198 0.002445 1.000000		

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STEP 1 CALIBRATE MODE BIAS AND L.A. COUNTY DUMMY SO THAT TRN SHR IN L.A. IS CORRECT

	TOTAL TRIPS	TOT PCT BY CTY	TRANSIT TRIPS	TRN SHR W/I CTY	TRN PCT BY CNTY	MODE	CHOICES	TOTAL
						DRV ALONE SR 2 SR 3+	WLK PND PNP KNR	
L.A.*	4,601,414	0.653477	441,276	0.0959	0.904672	3,238,668 656,470 265,001 375,040 43,024 7,634 15,577 4,601,414		
OBS TRP	4,601,426	0.653479	593,684	0.129021	1.217129	3,126,171 617,274 264,297 518,450 48,297 8,528 18,409 4,601,426		
OBS SHR						0.7038418 0.1426669 0.057591 0.081505 0.009350 0.001659 0.003385 1.000000		
EST SHR						0.6793935 0.1341487 0.057438 0.112671 0.010496 0.001853 0.004000 1.000003		
EST/OBS						0.9652645 0.9402930 0.997344 1.382385 1.122549 1.117097 1.181804		
LN(EST/OBS)						-0.035353 -0.061563 -0.00265 0.323810 0.115602 0.110734 0.167042		
DUMMIES						-0.2484 0 -1.4377 3.3248 -0.8101 -1.035 0.3837		
DUM - LN						-0.213046 0.0615637 -1.43504 3.000989 -0.92570 -1.14573 0.216657		
ADJ DUMMIES						-0.274610 0 -1.49660 2.939425 -0.98726 -1.20729 0.155093		
						UPRM(41) UPRM(42) UPRM(32) UPRM(21) UPRM(22) UPRM(23)		

TABLE 6.2 SPREADSHEET FOR MCHWORK MODEL RECALIBRATION -- FIRST STAGE

LA COUNTY ADJUSTMENT -- ITERATION 1

***** L.A.* *****	TOTAL TRIPS	TOT PCT BY CTY	TRANSIT TRIPS	TRN SHR W/I CTY	TRN PCT BY CNTY	=====	MODE	=====	CHOICES	=====	TOTAL		
						DRV ALONE	SR 2	SR 3+	WLK	PND	PNP	KNR	
OBS TRP	4,601,414	0.653477	441,276	0.0959	0.904672	3,238,668	656,470	265,001	375,040	43,024	7,634	15,577	4,601,414
EST TRP	4,601,414	0.653477	484,284	0.105246	0.992845	3,198,923	654,335	263,872	417,489	42,966	7,727	16,102	4,601,414
OBS SHR						0.7038418	0.1426669	0.057591	0.081505	0.009350	0.001659	0.003385	1.000000
EST SHR						0.6952043	0.1422030	0.057345	0.090730	0.009337	0.001679	0.003499	1.000000
EST/OBS						0.9877280	0.9967480	0.995740	1.113184	0.998643	1.012173	1.033701	
LN(EST/OBS)						-0.012347	-0.003257	-0.00426	0.107225	-0.00135	0.012099	0.033146	
DUMMIES						-0.274610	0	-1.49660	2.939425	-0.98726	-1.20729	0.155093	
DUM - LN						-0.262262	0.0032572	-1.49233	2.832200	-0.98590	-1.21939	0.121947	
ADJ DUMMIES						-0.265520	0	-1.49559	2.828943	-0.98916	-1.22265	0.118690	
						UPRM(41)		UPRM(42)	UPRM(32)	UPRM(21)	UPRM(22)	UPRM(23)	

LA COUNTY ADJUSTMENT -- ITERATION 2

***** L.A.* *****	TOTAL TRIPS	TOT PCT BY CTY	TRANSIT TRIPS	TRN SHR W/I CTY	TRN PCT BY CNTY	=====	MODE	=====	CHOICES	=====	TOTAL		
						DRV ALONE	SR 2	SR 3+	WLK	PND	PNP	KNR	
OBS TRP	4,601,414	0.653477	441,276	0.0959	0.904672	3,238,668	656,470	265,001	375,040	43,024	7,634	15,577	4,601,414
EST TRP	4,601,475	0.653486	455,005	0.098882	0.932819	3,225,700	656,077	264,693	388,682	42,904	7,661	15,758	4,601,475
OBS SHR						0.7038418	0.1426669	0.057591	0.081505	0.009350	0.001659	0.003385	1.000000
EST SHR						0.7010236	0.1425816	0.057524	0.084470	0.009324	0.001664	0.003424	1.000013
EST/OBS						0.9959959	0.9994015	0.998838	1.036374	0.997202	1.003527	1.011617	
LN(EST/OBS)						-0.004012	-0.000598	-0.00116	0.035728	-0.00280	0.003521	0.011550	
DUMMIES						-0.265520	0	-1.49559	2.828943	-0.98916	-1.22265	0.118690	
DUM - LN						-0.261507	0.0005985	-1.49443	2.793214	-0.98636	-1.22617	0.107139	
ADJ DUMMIES						-0.262106	0	-1.49502	2.792616	-0.98696	-1.22677	0.106540	
						UPRM(41)		UPRM(42)	UPRM(32)	UPRM(21)	UPRM(22)	UPRM(23)	

TABLE 6.3 SPREADSHEET FOR MCHWORK MODEL RECALIBRATION -- FIRST STAGE

LA COUNTY ADJUSTMENT -- ITERATION 3

***** L.A.*	TOTAL TRIPS	TOT PCT BY CTY	TRANSIT TRIPS	TRN SHR W/I CTY	TRN PCT BY CNTY	DRV ALONE	SR 2	SR 3+	WLK	PND	PNP	KNR	TOTAL
OBS TRP	4,601,414	0.653477	441,276	0.0959	0.904672	3,238,668	656,470	265,001	375,040	43,024	7,634	15,577	4,601,414
EST TRP	4,601,411	0.653477	445,766	0.096875	0.913878	3,234,380	656,348	264,917	379,519	42,972	7,641	15,634	4,601,411
OBS SHR						0.7038418	0.1426669	0.057591	0.081505	0.009350	0.001659	0.003385	1.000000
EST SHR						0.7029100	0.1426405	0.057572	0.082478	0.009338	0.001660	0.003397	0.999999
EST/OBS						0.9986760	0.9998144	0.999683	1.011942	0.998782	1.000908	1.003657	
LN(EST/OBS)						-0.001324	-0.000185	-0.00031	0.011871	-0.00121	0.000907	0.003650	
DUMMIES						-0.262106	0	-1.49502	2.792616	-0.98696	-1.22677	0.106540	
DUM - LN						-0.260781	0.0001856	-1.49471	2.780744	-0.98574	-1.22768	0.102890	
ADJ DUMMIES						-0.260967	0	-1.49489	2.780558	-0.98593	-1.22786	0.102704	
						UPRM(41)		UPRM(42)	UPRM(32)	UPRM(21)	UPRM(22)	UPRM(23)	

LA COUNTY ADJUSTMENT -- ITERATION 4

***** L.A.*	TOTAL TRIPS	TOT PCT BY CTY	TRANSIT TRIPS	TRN SHR W/I CTY	TRN PCT BY CNTY	DRV ALONE	SR 2	SR 3+	WLK	PND	PNP	KNR	TOTAL
OBS TRP	4,601,414	0.653477	441,276	0.0959	0.904672	3,238,668	656,470	265,001	375,040	43,024	7,634	15,577	4,601,414
EST TRP	4,601,438	0.653480	442,785	0.096227	0.907766	3,237,238	656,450	264,965	376,543	43,014	7,637	15,591	4,601,438
OBS SHR						0.7038418	0.1426669	0.057591	0.081505	0.009350	0.001659	0.003385	1.000000
EST SHR						0.7035311	0.1426626	0.057583	0.081832	0.009347	0.001659	0.003388	1.000005
EST/OBS						0.9995585	0.9999697	0.999864	1.004007	0.999758	1.000384	1.000896	
LN(EST/OBS)						-0.000441	-0.000030	-0.00013	0.003999	-0.00024	0.000384	0.000896	
DUMMIES						-0.260967	0	-1.49489	2.780558	-0.98593	-1.22786	0.102704	
DUM - LN						-0.260525	0.0000302	-1.49476	2.776559	-0.98568	-1.22825	0.101808	
ADJ DUMMIES						-0.260556	0	-1.49479	2.776529	-0.98571	-1.22828	0.101777	
						UPRM(41)		UPRM(42)	UPRM(32)	UPRM(21)	UPRM(22)	UPRM(23)	

TABLE 7.1 SPREADSHEET FOR MCHWORK MODEL RECALIBRATION -- SECOND STAGE

HOME BASED WORK MODEL RECALIBRATION --- BIAS COEFFICIENTS ADJUSTMENT (UFMTR REPORT 4)
 ORANGE, RIVERSIDE, SANTA BARBARA, AND VENTURA COUNTIES

MODE	CNTY	(1) OBSERVED TRIPS	(2) PREDICTED TRIPS	(3) PREDICTED SHARE	(4) OBSERVED SHARE	(5) (3)/(4)	(6) LN(5)	(7) COUNTY DUMMY	(8) (7)-(6)	(9) NEW COEFFICIENT
AUTO	OR	1529657	1528498	0.97775876	0.97850000	0.99924247	-0.00075782	0.00000000	0.00075782	0.00000000
	ITER 1	1529657	1529546	0.97842915	0.97850000	0.99992759	-0.00007241	0.00000000	0.00007241	0.00000000
	ITER 2	1529658	1529653	0.97849697	0.97850000	0.99999690	-0.00000310	0.00000000	0.00000310	0.00000000
	ITER 3	1529658	1529657	0.97849953	0.97850000	0.99999952	-0.00000048	0.00000000	0.00000048	0.00000000
	ITER 4	1529658	1529657	0.97849953	0.97850000	0.99999952	-0.00000048	0.00000000	0.00000048	0.00000000
TRANSIT	OR	33610	34769	0.02224124	0.02150000	1.03447638	0.03389539	-0.19400000	-0.22789539	-0.22865320
	ITER 1	33610	33721	0.02157085	0.02150000	1.00329541	0.00328999	-0.22865320	-0.23194320	-0.23201561
	ITER 2	33610	33615	0.02150303	0.02150000	1.00014097	0.00014096	-0.23201561	-0.23215657	-0.23215966
	ITER 3	33610	33611	0.02150047	0.02150000	1.00002196	0.00002196	-0.23215966	-0.23218162	-0.23218210
	ITER 4	33610	33611	0.02150047	0.02150000	1.00002196	0.00002196	-0.23218210	-0.23220406	-0.23220454
AUTO	RV	232819	233683	0.98895858	0.98530000	1.00371316	0.00370628	0.00000000	-0.00370628	0.00000000
	ITER 1	232819	233021	0.98615696	0.98530000	1.00086974	0.00086937	0.00000000	-0.00086937	0.00000000
	ITER 2	232819	232864	0.98549253	0.98530000	1.00019540	0.00019538	0.00000000	-0.00019538	0.00000000
	ITER 3	232819	232831	0.98535287	0.98530000	1.00005366	0.00005366	0.00000000	-0.00005366	0.00000000
	ITER 4	232819	232818	0.98529785	0.98530000	0.99999782	-0.00000218	0.00000000	0.00000218	0.00000000
TRANSIT	RV	3473	2609	0.01104142	0.01470000	0.75111723	-0.28619354	0.41000000	0.69619354	0.69989982
	ITER 1	3473	3271	0.01384304	0.01470000	0.94170351	-0.06006479	0.69989982	0.75996461	0.76083398
	ITER 2	3473	3428	0.01450747	0.01470000	0.98690298	-0.01318354	0.76083398	0.77401752	0.77421290
	ITER 3	3473	3461	0.01464713	0.01470000	0.99640350	-0.00360298	0.77421290	0.77781588	0.77786954
	ITER 4	3473	3474	0.01470215	0.01470000	1.00014614	0.00014612	0.77786954	0.77772341	0.77772123

TABLE 7.2 SPREADSHEET FOR MCHWORK MODEL RECALIBRATION -- SECOND STAGE

HOME BASED WORK MODEL RECALIBRATION --- BIAS COEFFICIENTS ADJUSTMENT (UFMTR REPORT 4)
 ORANGE, RIVERSIDE, SANTA BARBARA, AND VENTURA COUNTIES

MODE	CNTY	(1) OBSERVED TRIPS	(2) PREDICTED TRIPS	(3) PREDICTED SHARE	(4) OBSERVED SHARE	(5) (3)/(4)	(6) LN(5)	(7) COUNTY DUMMY	(8) (7)-(6)	(9) NEW COEFFICIENT
AUTO	SB	325962	324715	0.98153102	0.98530000	0.99617479	-0.00383254	0.00000000	0.00383254	0.00000000
	ITER 1	325962	325788	0.98477443	0.98530000	0.99946659	-0.00053356	0.00000000	0.00053356	0.00000000
	ITER 2	325961	325931	0.98520966	0.98530000	0.99990831	-0.00009169	0.00000000	0.00009169	0.00000000
	ITER 3	325962	325963	0.98530341	0.98530000	1.00000346	0.00000346	0.00000000	-0.00000346	0.00000000
	ITER 4	325962	325962	0.98530039	0.98530000	1.00000039	0.00000039	0.00000000	-0.00000039	0.00000000
TRANSIT	SB	4863	6110	0.01846898	0.01470000	1.25639313	0.22824502	0.36600000	0.13775498	0.13392243
	ITER 1	4863	5037	0.01522557	0.01470000	1.03575323	0.03512892	0.13392243	0.09879351	0.09825996
	ITER 2	4863	4893	0.01479034	0.01470000	1.00614569	0.00612689	0.09825996	0.09213307	0.09204138
	ITER 3	4863	4862	0.01469659	0.01470000	0.99976815	-0.00023187	0.09204138	0.09227325	0.09227671
	ITER 4	4863	4863	0.01469961	0.01470000	0.99997378	-0.00002622	0.09227671	0.09230293	0.09230332
AUTO	VE	305076	306114	0.98865090	0.98530000	1.00340089	0.00339512	0.00000000	-0.00339512	0.00000000
	ITER 1	305076	305313	0.98606392	0.98530000	1.00077532	0.00077502	0.00000000	-0.00077502	0.00000000
	ITER 2	305076	305128	0.98546643	0.98530000	1.00016891	0.00016890	0.00000000	-0.00016890	0.00000000
	ITER 3	305076	305088	0.98533724	0.98530000	1.00003780	0.00003780	0.00000000	-0.00003780	0.00000000
	ITER 4	305076	305081	0.98531464	0.98530000	1.00001485	0.00001485	0.00000000	-0.00001485	0.00000000
TRANSIT	VE	4552	3514	0.01134910	0.01470000	0.77204781	-0.25870880	0.10740000	0.36610880	0.36950392
	ITER 1	4552	4315	0.01393608	0.01470000	0.94803253	-0.05336647	0.36950392	0.42287039	0.42364541
	ITER 2	4552	4500	0.01453357	0.01470000	0.98867818	-0.01138639	0.42364541	0.43503180	0.43520070
	ITER 3	4552	4540	0.01466276	0.01470000	0.99746644	-0.00253678	0.43520070	0.43773748	0.43777528
	ITER 4	4552	4547	0.01468536	0.01470000	0.99900438	-0.00099612	0.43777528	0.43877140	0.43878625

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TABLE 7.3 SPREADSHEET FOR MCHWORK MODEL RECALIBRATION -- SECOND STAGE

HOME BASED WORK MODEL RECALIBRATION --- BIAS COEFFICIENTS ADJUSTMENT (UFMTR REPORT 4)
 ORANGE, RIVERSIDE, SANTA BARBARA, AND VENTURA COUNTIES

MODE	CNTY	(1) OBSERVED TRIPS	(2) PREDICTED TRIPS	(3) PREDICTED SHARE	(4) OBSERVED SHARE	(5) (3)/(4)	(6) LN(5)	(7) COUNTY DUMMY	(8) (7)-(6) COEFFICIENT	(9) NEW
AUTO	TOT	2393514	2393010	0.980737	0.980943	0.999790				
	ITER 1	2393514	2393668	0.981007	0.980943	1.000065				
	ITER 2	2393514	2393576	0.980969	0.980943	1.000026				
	ITER 3	2393515	2393539	0.980953	0.980943	1.000010				
	ITER 4	2393515	2393518	0.980945	0.980943	1.000001				
TRANSIT	TOT	46498	47002	0.019263	0.019057	1.010831				
	ITER 1	46498	46344	0.018993	0.019057	0.996680				
	ITER 2	46498	46436	0.019031	0.019057	0.998658				
	ITER 3	46498	46474	0.019047	0.019057	0.999475				
	ITER 4	46498	46495	0.019055	0.019057	0.999927				
TOTAL	TOT	2440012	2440012	1.000000	1.000000	1.000000				
	ITER 1	2440012	2440012	1.000000	1.000000	1.000000				
	ITER 2	2440012	2440012	1.000000	1.000000	1.000000				
	ITER 3	2440013	2440013	1.000000	1.000000	1.000000				
	ITER 4	2440013	2440013	1.000000	1.000000	1.000000				

Tables 7.1 to 7.3 are the spreadsheets for estimating county-specific transit dummies, Table 7.1 is for Orange and Riverside Counties. Table 7.2 is for San Bernardino and Ventura Counties. Table 7.3 is the summation over all five counties in the region, including L.A. County. After the fourth iteration, the ratio of predicted shares to observed shares (Column 5) are very close to one and the associated dummy adjustments (Column 6) are very close to zero. Thus, recalibration terminated.

Table 8 is a summary table, summarizing the final results of Tables 6 and 7.

3.3 Recalibration of MCHNWRK Model

The all-bus network FAR82VAL, is the transit network coded for calibration purpose. The input files to MCHNWRK model associated with this FAR82VAL network are:

1. MRP.FAR82VAL.MD10 ---midday transit time,
2. MRP.Y80Z1628.H8 ---highway time and distance,
3. MRP.FAR82VAL.RECALIB.FAREMD ---midday transit cost,
4. MRP.TT.H0000W.Y80PA4.DATA ---YEAR 1980 TRIP TABLE,
5. MRP.TAZ.SCAG80B.DATA ---year 1980 socioeconomic characteristic.

Tables 9.1 to 9.4 and 10.1 to 10.4 are the two sets of spreadsheets developed for recalibrating MCHNWRK model. Tables 9.1 to 9.4 are for home-based-other trips while Tables 10.1 to 10.4 are for non-home-based-trips. The logic behind these spreadsheets are the same as those applied for MCHWORK model.

For home-based-other trip purpose, it can be found from Tables 9 that, after the seventh iteration, the ratio of predicted versus observed shares (Column 5) was not more than 1.0018, which implies an error fo less than 0.2%.

For non-home-based trips it can be found from Table 10.4 that after the seventh iteration, the ratio of predicted versus observed (Column 5) trips for 000W purposes (ie. first four rows in iteration 7) are extremely close to one (1.000000035). Notice that the perfect match for 00 and 0W trips cannot be achieved simultaneously in this recalibration process because there were only two ASC's specified in the model. If we were to produce a perfect fit for both 00 and 0W trip purposes, two more ASC's are needed for the model.

TABLE 8 SUMMARY RESULT FOR MCHWORK MODEL RECALIBRATION

MODE CHOICE VALIDATION (FAREMTRX) BASE FARES
 RESULTS OF HOME-BASED WORK USING CALIBRATED UPARMS
 NETWORK: FAR82VAL

	AUTO PERSON	AUTO DA	AUTO 2P	AUTO 3+P	TRANSIT PERSON	TRANSIT WALK	TRANSIT PNR	TRANSIT PNR	TRANSIT KNR	TOTAL PERSON	COUNTY/REGION SHR AUTO PERSON	TRANSIT PERSON
LA-PREDICTED	4158651	3237238	656450	264965	442768	376543	43014	7637	15591	4601419	0.634698	0.912928
PREDICTED SHR	0.903776	0.703530	0.142663	0.057583	0.096224	0.081831	0.009347	0.001659	0.003388	1.00		
OBSERVED SHR		0.703840	0.142669	0.057591		0.081505	0.00935	0.001659	0.00385	1.00		
OR-PREDICTED	1529657	1199465	232886	97320	33611	24557	6731	1258	443	1563268	0.233458	0.059538
PREDICTED SHR	0.978500	0.767280	0.148974	0.062254	0.021500	0.015709	0.004306	0.000805	0.000283	1.00		
OBSERVED SHR					0.021500							
RI-PREDICTED	232818	186903	33651	12263	3474	3474	0	0	0	236292	0.035532	0.008422
PREDICTED SHR	0.985298	0.790983	0.142413	0.051898	0.014702	0.014702	0	0	0	1.00		
OBSERVED SHR					0.014700							
SB-PREDICTED	325962	259881	47864	18216	4863	3493	1028	196	151	330825	0.049748	0.008468
PREDICTED SHR	0.985300	0.785554	0.144681	0.055062	0.014700	0.010558	0.003107	0.000592	0.000456	1.00		
OBSERVED SHR					0.014700							
VE-PREDICTED	305081	239079	46790	19213	4547	4389	121	22	15	309628	0.046561	0.010641
PREDICTED SHR	0.985315	0.772149	0.151117	0.062052	0.014685	0.014175	0.000391	0.000071	0.000048	1.00		
OBSERVED SHR					0.014700							
TOTAL-PREDICTED	6552169	5122566	1017641	411977	489263	412456	50894	9113	16200	7041432	1	1
PREDICTED SHR T	0.930517	0.727489	0.144522	0.058508	0.069483	0.058576	0.007228	0.001294	0.002301	1.00		
OBSERVED SHR SUB		0.778500	0.157800	0.063900		0.849900	0.097500	0.017300	0.035300	2.00		
PREDICTED SHR SUB		0.781812	0.155314	0.062876		0.843015	0.104022	0.018626	0.033111	2.00		

TABLE 9.1 SPREADSHEET FOR MCHNRK RECALIBRATION -- LA/OR COUNTIES

HOME-OTHER MODEL RECALIBRATION --- BIAS COEFFICIENTS ADJUSTMENT (UFMTR REPORT 4)

MODE	CNTY	(1) OBSERVED TRIPS	(2) PREDICTED TRIPS	(3) PREDICTED SHARE	(4) OBSERVED SHARE	(5) (3)/(4)	(6) LN(5)	(7) COUNTY DUMMY	(8) (7)·(6)	(9) NEW COEFFICIENT
AUTO	LA	12973916	12845026	0.95481912	0.96440000	0.99006545	-0.00998423	0.00000000	0.00998423	0.00000000
ITER 1		12973916	12912324	0.95982163	0.96440000	0.99525263	-0.00475868	0.00000000	0.00475868	0.00000000
ITER 2		12973916	12943984	0.96217504	0.96440000	0.99769291	-0.00230976	0.00000000	0.00230976	0.00000000
ITER 3		12973916	12959242	0.96330923	0.96440000	0.99886896	-0.00113168	0.00000000	0.00113168	0.00000000
ITER 4		12973916	12966702	0.96386376	0.96440000	0.99944396	-0.00055619	0.00000000	0.00055619	0.00000000
ITER 5		12973916	12970360	0.96413567	0.96440000	0.99972591	-0.00027413	0.00000000	0.00027413	0.00000000
ITER 6		12973916	12972168	0.96427006	0.96440000	0.99986527	-0.00013474	0.00000000	0.00013474	0.00000000
ITER 7		12973916	12973054	0.96433592	0.96440000	0.99993356	-0.00006644	0.00000000	0.00006644	0.00000000
TRANSIT	LA	478921	607811	0.04518088	0.03560000	1.26912581	0.23832833	-0.34750000	-0.58582833	-0.59581255
ITER 1		478921	540513	0.04017837	0.03560000	1.12860577	0.12098304	-0.59581255	-0.71679559	-0.72155427
ITER 2		478921	508853	0.03782496	0.03560000	1.06249883	0.06062352	-0.72155427	-0.78217779	-0.78448755
ITER 3		478921	493595	0.03669077	0.03560000	1.03063971	0.03017969	-0.78448755	-0.81466724	-0.81579892
ITER 4		478921	486135	0.03613624	0.03560000	1.01506303	0.01495071	-0.81579892	-0.83074963	-0.83130582
ITER 5		478921	482477	0.03586433	0.03560000	1.00742503	0.00739760	-0.83130582	-0.83870342	-0.83897755
ITER 6		478921	480669	0.03572994	0.03560000	1.00364988	0.00364323	-0.83897755	-0.84262078	-0.84275552
ITER 7		478921	479783	0.03566408	0.03560000	1.00179989	0.00179827	-0.84275552	-0.84455379	-0.84462023
AUTO	OR	3820516	3801497	0.98556917	0.99050000	0.99502188	-0.00499055	0.00000000	0.00499055	0.00000000
ITER 1		3820516	3814972	0.98906268	0.99050000	0.99854889	-0.00145216	0.00000000	0.00145216	0.00000000
ITER 2		3820516	3818792	0.99005304	0.99050000	0.99954875	-0.00045135	0.00000000	0.00045135	0.00000000
ITER 3		3820516	3819986	0.99036260	0.99050000	0.99986128	-0.00013873	0.00000000	0.00013873	0.00000000
ITER 4		3820516	3820350	0.99045697	0.99050000	0.99995655	-0.00004345	0.00000000	0.00004345	0.00000000
ITER 5		3820516	3820453	0.99048367	0.99050000	0.99998351	-0.00001649	0.00000000	0.00001649	0.00000000
ITER 6		3820516	3820502	0.99049637	0.99050000	0.99999634	-0.00000366	0.00000000	0.00000366	0.00000000
ITER 7		3820516	3820514	0.99049948	0.99050000	0.99999948	-0.00000052	0.00000000	0.00000052	0.00000000
TRANSIT	OR	36643	55662	0.01443083	0.00950000	1.51903458	0.41807499	-0.14070000	-0.55877499	-0.56376554
ITER 1		36643	42187	0.01093732	0.00950000	1.15129733	0.14088942	-0.56376554	-0.70465496	-0.70610712
ITER 2		36643	38367	0.00994696	0.00950000	1.04704825	0.04597501	-0.70610712	-0.75208213	-0.75253348
ITER 3		36643	37173	0.00963740	0.00950000	1.01446359	0.01435999	-0.75253348	-0.76689347	-0.76703220
ITER 4		36643	36809	0.00954303	0.00950000	1.00452991	0.00451968	-0.76703220	-0.77155188	-0.77159533
ITER 5		36643	36706	0.00951633	0.00950000	1.00171900	0.00171753	-0.77159533	-0.77331286	-0.77332935
ITER 6		36643	36657	0.00950363	0.00950000	1.00038178	0.00038171	-0.77332935	-0.77371105	-0.77371471
ITER 7		36643	36645	0.00950052	0.00950000	1.00005429	0.00005429	-0.77371471	-0.77376901	-0.77376953

TABLE 9.2 SPREADSHEET FOR MCHNRK RECALIBRATION -- RV/SB COUNTIES

HOME-OTHER MODEL RECALIBRATION --- BIAS COEFFICIENTS ADJUSTMENT (UFMTR REPORT 4)

MODE	CNTY	(1) OBSERVED TRIPS	(2) PREDICTED TRIPS	(3) PREDICTED SHARE	(4) OBSERVED SHARE	(5)	(6)	(7) COUNTY DUMMY	(8)	(9) NEW COEFFICIENT
						(3)/(4)	LN(5)		(7)-(6)	
AUTO	RV	772812	772937	0.99526150	0.99510000	1.00016229	0.00016228	0.00000000	-0.00016228	0.00000000
ITER 1		772812	772856	0.99515720	0.99510000	1.00005748	0.00005748	0.00000000	-0.00005748	0.00000000
ITER 2		772812	772829	0.99512243	0.99510000	1.00002255	0.00002255	0.00000000	-0.00002255	0.00000000
ITER 3		772812	772820	0.99511085	0.99510000	1.00001090	0.00001090	0.00000000	-0.00001090	0.00000000
ITER 4		772812	772813	0.99510183	0.99510000	1.00000184	0.00000184	0.00000000	-0.00000184	0.00000000
ITER 5		772812	772813	0.99510183	0.99510000	1.00000184	0.00000184	0.00000000	-0.00000184	0.00000000
ITER 6		772812	772813	0.99510183	0.99510000	1.00000184	0.00000184	0.00000000	-0.00000184	0.00000000
ITER 7		772812	772810	0.99509797	0.99510000	0.99999796	-0.00000204	0.00000000	0.00000204	0.00000000
TRANSIT	RV	3805	3680	0.00473850	0.00490000	0.96704091	-0.03351448	0.38190000	0.41541448	0.41557676
ITER 1		3805	3761	0.00484280	0.00490000	0.98832632	-0.01174235	0.41557676	0.42731912	0.42737660
ITER 2		3805	3788	0.00487757	0.00490000	0.99542146	-0.00458906	0.42737660	0.43196566	0.43198820
ITER 3		3805	3797	0.00488915	0.00490000	0.99778650	-0.00221595	0.43198820	0.43420415	0.43421505
ITER 4		3805	3804	0.00489817	0.00490000	0.99962598	-0.00037409	0.43421505	0.43458914	0.43459098
ITER 5		3805	3804	0.00489817	0.00490000	0.99962598	-0.00037409	0.43459098	0.43496507	0.43496691
ITER 6		3805	3804	0.00489817	0.00490000	0.99962598	-0.00037409	0.43496691	0.43534100	0.43534284
ITER 7		3805	3807	0.00490203	0.00490000	1.00041433	0.00041424	0.43534284	0.43492860	0.43492656
AUTO	SB	1082418	1078241	0.99125992	0.99510000	0.99614102	-0.00386645	0.00000000	0.00386645	0.00000000
ITER 1		1082418	1081521	0.99427533	0.99510000	0.99917127	-0.00082908	0.00000000	0.00082908	0.00000000
ITER 2		1082418	1082206	0.99490507	0.99510000	0.99980411	-0.00019591	0.00000000	0.00019591	0.00000000
ITER 3		1082418	1082370	0.99505584	0.99510000	0.99995562	-0.00004438	0.00000000	0.00004438	0.00000000
ITER 4		1082418	1082409	0.99509169	0.99510000	0.99999165	-0.00000835	0.00000000	0.00000835	0.00000000
ITER 5		1082418	1082416	0.99509813	0.99510000	0.99999812	-0.00000188	0.00000000	0.00000188	0.00000000
ITER 6		1082418	1082416	0.99509813	0.99510000	0.99999812	-0.00000188	0.00000000	0.00000188	0.00000000
ITER 7		1082418	1082418	0.99509997	0.99510000	0.99999997	-0.00000003	0.00000000	0.00000003	0.00000000
TRANSIT	SB	5330	9507	0.00874008	0.00490000	1.78368894	0.57868366	0.24950000	-0.32918366	-0.33305011
ITER 1		5330	6227	0.00572467	0.00490000	1.16830031	0.15554997	-0.33305011	-0.48860008	-0.48942915
ITER 2		5330	5542	0.00509493	0.00490000	1.03978165	0.03901074	-0.48942915	-0.52843989	-0.52863580
ITER 3		5330	5378	0.00494416	0.00490000	1.00901222	0.00897185	-0.52863580	-0.53760765	-0.53765203
ITER 4		5330	5339	0.00490831	0.00490000	1.00169510	0.00169366	-0.53765203	-0.53934569	-0.53935403
ITER 5		5330	5332	0.00490187	0.00490000	1.00038177	0.00038169	-0.53935403	-0.53973573	-0.53973761
ITER 6		5330	5332	0.00490187	0.00490000	1.00038177	0.00038169	-0.53973761	-0.54011930	-0.54012118
ITER 7		5330	5330	0.00490003	0.00490000	1.00000653	0.00000653	-0.54012118	-0.54012771	-0.54012774

TABLE 9.3 SPREADSHEET FOR MCHNRK RECALIBRATION -- VE COUNTY

HOME-OTHER MODEL RECALIBRATION --- BIAS COEFFICIENTS ADJUSTMENT (UFMTR REPORT 4)

MODE	CNTY	(1) OBSERVED TRIPS	(2) PREDICTED TRIPS	(3) PREDICTED SHARE	(4) OBSERVED SHARE	(5) (3)/(4)	(6) LN(5)	(7) COUNTY DUMMY	(8) (7)-(6)	(9) NEW COEFFICIENT
AUTO	VE	974046	970625	0.99160539	0.99510000	0.99648818	-0.00351800	0.00000000	0.00351800	0.00000000
	ITER 1	974046	973318	0.99435660	0.99510000	0.99925294	-0.00074734	0.00000000	0.00074734	0.00000000
	ITER 2	974046	973870	0.99492053	0.99510000	0.99981964	-0.00018037	0.00000000	0.00018037	0.00000000
	ITER 3	974046	974004	0.99505742	0.99510000	0.99995722	-0.00004279	0.00000000	0.00004279	0.00000000
	ITER 4	974046	974037	0.99509114	0.99510000	0.99999109	-0.00000891	0.00000000	0.00000891	0.00000000
	ITER 5	974046	974042	0.99509625	0.99510000	0.99999623	-0.00000377	0.00000000	0.00000377	0.00000000
	ITER 6	974046	974045	0.99509931	0.99510000	0.99999931	-0.00000069	0.00000000	0.00000069	0.00000000
	ITER 7	974046	974045	0.99509931	0.99510000	0.99999931	-0.00000069	0.00000000	0.00000069	0.00000000
TRANSIT	VE	4796	8217	0.00839461	0.00490000	1.71318637	0.53835501	0.36230000	-0.17605501	-0.17957301
	ITER 1	4796	5524	0.00564340	0.00490000	1.15171492	0.14125207	-0.17957301	-0.32082508	-0.32157243
	ITER 2	4796	4972	0.00507947	0.00490000	1.03662683	0.03597201	-0.32157243	0.35754443	-0.35772481
	ITER 3	4796	4838	0.00494258	0.00490000	1.00868878	0.00865125	0.35772481	0.36637605	-0.36641884
	ITER 4	4796	4805	0.00490886	0.00490000	1.00180851	0.00180688	0.36641884	-0.36822571	-0.36823462
	ITER 5	4796	4800	0.00490375	0.00490000	1.00076604	0.00076575	-0.36823462	-0.36900037	0.36900414
	ITER 6	4796	4797	0.00490069	0.00490000	1.00014057	0.00014056	-0.36900414	-0.36914470	0.36914539
	ITER 7	4796	4797	0.00490069	0.00490000	1.00014057	0.00014056	-0.36914539	-0.36928595	-0.36928664

TABLE 9.4 SPREADSHEET FOR MCHNRK RECALIBRATION -- REGIONAL TOTAL

HOME-OTHER MODEL RECALIBRATION --- BIAS COEFFICIENTS ADJUSTMENT (UFMTR REPORT 4)

MODE	CNTY	(1) OBSERVED TRIPS	(2) PREDICTED TRIPS	(3) PREDICTED SHARE	(4) OBSERVED SHARE	(5) (3)/(4)	(6) LN(5)	(7) COUNTY DUMMY	(8) (7)-(6) COEFFICIENT	(9) NEW
AUTO	TOT	19623707	19468326	0.96601647	0.97372647	0.99208196				
	ITER 1	19623707	19554991	0.97031678	0.97372647	0.99649830				
	ITER 2	19623707	19591681	0.97213733	0.97372647	0.99836798				
	ITER 3	19623707	19608422	0.97296802	0.97372647	0.99922108				
	ITER 4	19623707	19616311	0.97335947	0.97372647	0.99962309				
	ITER 5	19623707	19620084	0.97354669	0.97372647	0.99981536				
	ITER 6	19623707	19621944	0.97363898	0.97372647	0.99991015				
	ITER 7	19623707	19622841	0.97368349	0.97372647	0.99995586				
TRANSIT	TOT	529496	684877	0.03398353	0.02627353	1.29345143				
	ITER 1	529496	598212	0.02968322	0.02627353	1.12977683				
	ITER 2	529496	561522	0.02786267	0.02627353	1.06048449				
	ITER 3	529496	544781	0.02703198	0.02627353	1.02886761				
	ITER 4	529496	536892	0.02664053	0.02627353	1.01396853				
	ITER 5	529496	533119	0.02645331	0.02627353	1.00684288				
	ITER 6	529496	531259	0.02636102	0.02627353	1.00333011				
	ITER 7	529496	530362	0.02631651	0.02627353	1.00163604				
TOTAL	TOT	20153203	20153203	1.00000000	1.00000000	1.00000000				
	ITER 1	20153203	20153203	1.00000000	1.00000000	1.00000000				
	ITER 2	20153203	20153203	1.00000000	1.00000000	1.00000000				
	ITER 3	20153203	20153203	1.00000000	1.00000000	1.00000000				
	ITER 4	20153203	20153203	1.00000000	1.00000000	1.00000000				
	ITER 5	20153203	20153203	1.00000000	1.00000000	1.00000000				
	ITER 6	20153203	20153203	1.00000000	1.00000000	1.00000000				
	ITER 7	20153203	20153203	1.00000000	1.00000000	1.00000000				

TABLE 10.1 SPREADSHEET FOR NON-HOME-BASED MODE CHOICE MODEL

NON-HOME-BASED MODEL RECALIBRATION --- ASSUMING MODE SPLIT (.6905/.2960/.0135) (UFMTR REPORT 4)

BASE CALCULATION

MODE	1 TRIPS PRED	2 TRIPS OBS	3 SHR PRED	4 SHR OBS	5 (3)/(4)	6 LN(5)	7 BETA	8 BETA+(6)	9 ADJ BETA
DA OOW	8,033,501	8,071,118	0.687331557	0.69055	0.995339305	-0.00467158	-2.885	-2.88967158	-3.18277091
SR OOW	3,442,929	3,459,051	0.294570667	0.29595	0.995339305	-0.00467158	-2.813	-2.81767158	-3.11077091
TR OOW	211,526	157,787	0.018097775	0.0135	1.340575939	0.293099327	0	0.293099327	0
TT OOW	11,687,956	11,687,956	1	1	1	0	0	0	0
DA OO	5,766,108	5,789,184	0.687797442	0.69055	0.996013962	-0.00399400	-2.885	-2.88899400	-3.14462485
SR OO	2,471,189	2,481,079	0.294770332	0.29595	0.996013962	-0.00399400	-2.813	-2.81699400	-3.07262485
TR OO	146,142	113,176	0.017432225	0.0135	1.291275970	0.255630854	0	0.255630854	0
TT OO	8,383,439	8,383,439	1	1	1	0	0	0	0
DA OW	2,267,393	2,281,934	0.686149624	0.69055	0.993627724	-0.00639266	-2.885	-2.89139266	-3.27369023
SR OW	971,740	977,972	0.294064125	0.29595	0.993627724	-0.00639266	-2.813	-2.81939266	-3.20169023
TR OW	65,384	44,611	0.019786250	0.0135	1.465648159	0.382297574	0	0.382297574	0
TT OW	3,304,517	3,304,517	1	1	1	0	0	0	0

ITERATION 1

MODE	1 TRIPS PREO	2 TRIPS OBS	3 SHR PREO	4 SHR OBS	5 (3)/(4)	6 LN(5)	7 BETA	8 BETA+(6)	9 ADJ BETA
DA OOW	8,068,404	8,071,118	0.690317768	0.69055	0.999663700	-0.00033635	-3.18277091	-3.18310727	-3.20738497
SR OOW	3,457,887	3,459,051	0.295850472	0.29595	0.999663700	-0.00033635	-3.11077091	-3.11110727	-3.13538497
TR OOW	161,665	157,787	0.013831759	0.0135	1.024574800	0.024277697	0	0.024277697	0
TT OOW	11,687,956	11,687,956	1	1	1	0	0	0	0
DA OO	5,790,213	5,789,184	0.690672777	0.69055	1.000177796	0.000177781	-3.14462485	-3.14444707	-3.13136959
SR OO	2,481,520	2,481,079	0.296002619	0.29595	1.000177796	0.000177781	-3.07262485	-3.07244707	-3.05936959
TR OO	111,706	113,176	0.013324603	0.0135	0.987007661	-0.01307747	0	-0.01307747	0
TT OO	8,383,439	8,383,439	1	1	1	0	0	0	0
DA OW	2,278,191	2,281,934	0.689417122	0.69055	0.998359455	-0.00164189	-3.27369023	-3.27533213	-3.38855479
SR OW	976,367	977,972	0.295464480	0.29595	0.998359455	-0.00164189	-3.20169023	-3.20333213	-3.31655479
TR OW	49,959	44,611	0.015118397	0.0135	1.119881261	0.113222663	0	0.113222663	0
TT OW	3,304,517	3,304,517	1	1	1	0	0	0	0

TABLE 10.2 SPREADSHEET FOR NON-HOME-BASED MODE CHOICE MODEL

NON-HOME-BASED MODEL RECALIBRATION --- ASSUMING MODE SPLIT (.6905/.2960/.0135) (UFMTR REPORT 4)

ITERATION 2

MODE	1 TRIPS PRED	2 TRIPS OBS	3 SHR PRED	4 SHR OBS	5 (3)/(4)	6 LN(5)	7 BETA	8 BETA+(6)	9 ADJ BETA
DA OOO	8,070,934	8,071,118	0.690534213	0.69055	0.999977138	-0.00002286	-3.20738497	-3.20740783	-3.20907700
SR OOO	3,458,972	3,459,051	0.295943234	0.29595	0.999977138	-0.00002286	-3.13538497	-3.13540783	-3.13707700
TR OOO	158,051	157,787	0.013522552	0.0135	1.001670564	0.001669170	0	0.001669170	0
TT OOO	11,687,956	11,687,956		1	1	1	0		
DA OO	5,791,958	5,789,184	0.690880938	0.69055	1.000479238	0.000479123	-3.13136959	-3.13089047	-3.09524268
SR OO	2,482,268	2,481,079	0.296091830	0.29595	1.000479238	0.000479123	-3.05936959	-3.05889047	-3.02324268
TR OO	109,213	113,176	0.013027231	0.0135	0.964980105	-0.03564779	0	-0.03564779	0
TT OO	8,383,439	8,383,439		1	1	1	0		
DA OW	2,278,975	2,281,934	0.689654584	0.69055	0.998703330	-0.00129751	-3.38855479	-3.38985230	-3.48038099
SR OW	976,704	977,972	0.295566250	0.29595	0.998703330	-0.00129751	-3.31655479	-3.31785230	-3.40838099
TR OW	48,838	44,611	0.014779164	0.0135	1.094752918	0.090528692	0	0.090528692	0
TT OW	3,304,517	3,304,517		1	1	1	0		

ITERATION 3

MODE	1 TRIPS PRED	2 TRIPS OBS	3 SHR PRED	4 SHR OBS	5 (3)/(4)	6 LN(5)	7 BETA	8 BETA+(6)	9 ADJ BETA
DA OOO	8,071,092	8,071,118	0.690547808	0.69055	0.999996826	-0.00000317	-3.20907700	-3.20908017	-3.20931206
SR OOO	3,459,040	3,459,051	0.295949060	0.29595	0.999996826	-0.00000317	-3.13707700	-3.13708017	-3.13731206
TR OOO	157,824	157,787	0.013503130	0.0135	1.000231919	0.000231892	0	0.000231892	0
TT OOO	11,687,956	11,687,956		1	1	1	0		
DA OO	5,792,069	5,789,184	0.690894130	0.69055	1.000498342	0.000498218	-3.09524268	-3.09474446	-3.05764890
SR OO	2,482,315	2,481,079	0.296097484	0.29595	1.000498342	0.000498218	-3.02324268	-3.02274446	-2.98564890
TR OO	109,055	113,176	0.013008384	0.0135	0.963584055	-0.03709555	0	-0.03709555	0
TT OO	8,383,439	8,383,439		1	1	1	0		
DA OW	2,279,024	2,281,934	0.689669201	0.69055	0.998724496	-0.00127631	-3.48038099	-3.48165731	-3.57077217
SR OW	976,724	977,972	0.295572514	0.29595	0.998724496	-0.00127631	-3.40838099	-3.40965731	-3.49877217
TR OW	48,769	44,611	0.014758283	0.0135	1.093206214	0.089114859	0	0.089114859	0
TT OW	3,304,517	3,304,517		1	1	1	0		

TABLE 10.3 SPREADSHEET FOR NON-HOME-BASED MODE CHOICE MODEL

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NON-HOME-BASED MODEL RECALIBRATION --- ASSUMING MODE SPLIT (.6905/.2960/.0135) (UFMTR REPORT 4)

ITERATION 4

MODE	1 TRIPS PRED	2 TRIPS OBS	3 SHR PRED	4 SHR OBS	5 (3)/(4)	6 LN(5)	7 BETA	8 BETA+(6)	9 ADJ BETA
DA OOW	8,071,118	8,071,118	0.690549964	0.69055	0.999999948	-0.00000005	-3.20931206	-3.20931212	-3.20931588
SR OOW	3,459,050	3,459,051	0.295949984	0.29595	0.999999948	-0.00000005	-3.13731206	-3.13731212	-3.13731588
TR OOW	157,788	157,787	0.013500050	0.0135	1.000003764	0.000003764	0	0.000003764	0
TT OOW	11,687,956	11,687,956		1	1	1	0		
DA OO	5,792,086	5,789,184	0.690896134	0.69055	1.000501244	0.000501119	-3.05764890	-3.05714778	-3.01983213
SR OO	2,482,322	2,481,079	0.296098343	0.29595	1.000501244	0.000501119	-2.98564890	-2.98514778	-2.94783213
TR OO	109,031	113,176	0.013005522	0.0135	0.963371996	-0.03731565	0	-0.03731565	0
TT OO	8,383,439	8,383,439		1	1	1	0		
DA OW	2,279,032	2,281,934	0.689671743	0.69055	0.998728177	-0.00127263	-3.57077217	-3.57204480	-3.66091357
SR OW	976,728	977,972	0.295573604	0.29595	0.998728177	-0.00127263	-3.49877217	-3.50004480	-3.58891357
TR OW	48,757	44,611	0.014754652	0.0135	1.092937221	0.088868771	0	0.088868771	0
TT OW	3,304,517	3,304,517		1	1	1	0		

ITERATION 5

MODE	1 TRIPS PRED	2 TRIPS OBS	3 SHR PRED	4 SHR OBS	5 (3)/(4)	6 LN(5)	7 BETA	8 BETA+(6)	9 ADJ BETA
DA OOW	8,071,118	8,071,118	0.690549964	0.69055	0.999999948	-0.00000005	-3.20931588	-3.20931593	-3.20931970
SR OOW	3,459,050	3,459,051	0.295949984	0.29595	0.999999948	-0.00000005	-3.13731588	-3.13731593	-3.13731970
TR OOW	157,788	157,787	0.013500050	0.0135	1.000003764	0.000003764	0	0.000003764	0
TT OOW	11,687,956	11,687,956		1	1	1	0		
DA OO	5,792,086	5,789,184	0.690896134	0.69055	1.000501244	0.000501119	-3.01983213	-3.01933101	-2.98201536
SR OO	2,482,322	2,481,079	0.296098343	0.29595	1.000501244	0.000501119	-2.94783213	-2.94733101	-2.91001536
TR OO	109,031	113,176	0.013005522	0.0135	0.963371996	-0.03731565	0	-0.03731565	0
TT OO	8,383,439	8,383,439		1	1	1	0		
DA OW	2,279,032	2,281,934	0.689671743	0.69055	0.998728177	-0.00127263	-3.66091357	-3.66218620	-3.75105497
SR OW	976,728	977,972	0.295573604	0.29595	0.998728177	-0.00127263	-3.58891357	-3.59018620	-3.67905497
TR OW	48,757	44,611	0.014754652	0.0135	1.092937221	0.088868771	0	0.088868771	0
TT OW	3,304,517	3,304,517		1	1	1	0		

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TABLE 10.4 SPREADSHEET FOR NON-HOME-BASED MODE CHOICE MODEL

NON-HOME-BASED MODEL RECALIBRATION --- ASSUMING MODE SPLIT (.6905/.2960/.0135) (UFMTR REPORT 4)

ITERATION 6

MODE	1 TRIPS PRED	2 TRIPS OBS	3 SHR PRED	4 SHR OBS	5 (3)/(4)	6 LN(5)	7 BETA	8 BETA+(6)	9 ADJ BETA
DA OOW	8,071,118	8,071,118	0.690550024	0.69055	1.000000035	0.000000035	-3.20931970	-3.20931966	-3.20931709
SR OOW	3,459,051	3,459,051	0.295950010	0.29595	1.000000035	0.000000035	-3.13731970	-3.13731966	-3.13731709
TR OOW	157,787	157,787	0.013499965	0.0135	0.999997426	-0.00000257	0	-0.00000257	0
TT OOW	11,687,956	11,687,956		1	1	1	0		
DA OO	5,792,086	5,789,184	0.690896134	0.69055	1.000501244	0.000501119	-2.98201536	-2.98151424	-2.94419859
SR OO	2,482,322	2,481,079	0.296098343	0.29595	1.000501244	0.000501119	-2.91001536	-2.90951424	-2.87219859
TR OO	109,031	113,176	0.013005522	0.0135	0.963371996	-0.03731565	0	-0.03731565	0
TT OO	8,383,439	8,383,439		1	1	1	0		
DA OW	2,279,033	2,281,934	0.689671955	0.69055	0.998728484	-0.00127232	-3.75105497	-3.75232730	-3.84117556
SR OW	976,728	977,972	0.295573695	0.29595	0.998728484	-0.00127232	-3.67905497	-3.68032730	-3.76917556
TR OW	48,756	44,611	0.014754349	0.0135	1.092914805	0.088848260	0	0.088848260	0
TT OW	3,304,517	3,304,517		1	1	1	0		

ITERATION 7

MODE	1 TRIPS PRED	2 TRIPS OBS	3 SHR PRED	4 SHR OBS	5 (3)/(4)	6 LN(5)	7 BETA	8 BETA+(6)	9 ADJ BETA
DA OOW	8,071,118	8,071,118	0.690550024	0.69055	1.000000035	0.000000035	-3.20931709	-3.20931705	-3.20931448
SR OOW	3,459,051	3,459,051	0.295950010	0.29595	1.000000035	0.000000035	-3.13731709	-3.13731705	-3.13731448
TR OOW	157,787	157,787	0.013499965	0.0135	0.999997426	-0.00000257	0	-0.00000257	0
TT OOW	11,687,956	11,687,956		1	1	1	0		
DA OO	5,792,086	5,789,184	0.690896134	0.69055	1.000501244	0.000501119	-2.94419859	-2.94369747	-2.90638182
SR OO	2,482,322	2,481,079	0.296098343	0.29595	1.000501244	0.000501119	-2.87219859	-2.87169747	-2.83438182
TR OO	109,031	113,176	0.013005522	0.0135	0.963371996	-0.03731565	0	-0.03731565	0
TT OO	8,383,439	8,383,439		1	1	1	0		
DA OW	2,279,033	2,281,934	0.689671955	0.69055	0.998728484	-0.00127232	-3.84117556	-3.84244788	-3.93129615
SR OW	976,728	977,972	0.295573695	0.29595	0.998728484	-0.00127232	-3.76917556	-3.77044788	-3.85929615
TR OW	48,756	44,611	0.014754349	0.0135	1.092914805	0.088848260	0	0.088848260	0
TT OW	3,304,517	3,304,517		1	1	1	0		

4. USING UFARE8 FOR YEAR 2000 FORECAST

The recalibrated mode choice models were used to predict Year 2000 transit shares with CORE3CA6 network. Results from these new models can be compared with those generated previously for the CORE study. The most up-to-date fare policy for metrorail, which is somewhat different from that assumed for the CORE, was applied to setup the SYSIN file to UFARE8. These up-to-date fare policies were converted from FY89 values to FY80 values such that direct comparison between UFARE8 and FARE00 policies can be made. The comparison between most up-to-date fare assumptions and the CORE fare assumption are summarized in Table 11. From this table, we can see that the two fare policies were assumed differently. Generally, the base fares in the old FARE00 inputs were slightly higher than those assumed for UFARE8. However, the transfer fares in UFARE8 input were assumed much higher than FARE00. Especially when a transfer is taken to get on rail, the transfer charge has been increased from 10 cents in FARE00 to 37.8 cents (FY80 values) in UFARE8.

The results of mode choice step produced from these two fare programs are tabulated in Table 12.1 for HBWORK trips and 12.2 for H0000W trips. As expected, the new fare policy, which is imbedded with more expensive transfer charges is a less attractive transit service. The transit share dropped about 20% in HBWORK trips and almost 50% in H0000W trips.

The impact of losing riders due to the new fare policy to the new UFARE8 is documented in this technical memorandum. Hopefully, this documentation can be a useful background consideration when future transit fare policy is to be reconsidered.

TABLE 11 VALUES FOR FARE ASSUMPTIONS

FARE PGM PARAMETERS	FARE00 VALUES	UFARE8 VALUES	UFARE8 VALUES
FISCAL YEAR	FY80	FY80	FY89
CPI VALUES	233	233	375
PARKING CHARGES (\$)	1.00	1.00	1.00
FARE ZONE DISTANCE (MILES)	3.00	3.00	3.00
MODE 4 BASE FARE (\$)	0.5000	0.378	0.608
MODE 5 FARE/ZONE (\$)	0.1875	0.193	0.311
MODE 6 FARE/ZONE (\$)	0.2500	0.193	0.311
MODE 7 FARE/ZONE (\$)	0.2500	0.193	0.311
MODE 8 FARE/ZONE (\$)	0.3500	0.284	0.456
TRANSFER MODE 4 - 4 (\$)	0.1000	0.147	0.236
TRANSFER MODE 4 - 5 (\$)	0.1000	0.147	0.236
TRANSFER MODE 4 - 6 (\$)	0.1000	0.378	0.608
TRANSFER MODE 4 - 7 (\$)	0.1000	0.378	0.608
TRANSFER MODE 4 - 8 (\$)	0.1000	0.147	0.236
TRANSFER MODE 5 - 5 (\$)	0.0000	0.147	0.236
TRANSFER MODE 5 - 6 (\$)	0.1000	0.378	0.608
TRANSFER MODE 5 - 7 (\$)	0.1000	0.378	0.608
TRANSFER MODE 5 - 8 (\$)	0.1000	0.147	0.236
TRANSFER MODE 6 - 6 (\$)	0.0000	0.000	0.000
TRANSFER MODE 6 - 7 (\$)	0.1000	0.000	0.000
TRANSFER MODE 6 - 8 (\$)	0.1000	0.000	0.000
TRANSFER MODE 7 - 7 (\$)	0.0000	0.000	0.000
TRANSFER MODE 7 - 8 (\$)	0.1000	0.000	0.000
TRANSFER MODE 8 - 8 (\$)	0.0000	0.000	0.000

TABLE 12.1 COMPARISON OF MODE CHOICE --- HBWORK TRIPS

YEAR 2000 PREDICTED MODE SHARES (HBWORK TRIPS) --- FARE00									
	DA	SR2	SR3+	WLK	PND	PNP	KNR	TOT (TRN)	SHR (TRN)
LA	3706248	812071	371283	441589	56681	11333	23449	533052	0.098
OR	1727054	344437	163695	22870	3333	602	509	27314	0.012
SB	350345	65675	26612	2882	0	0	0	2882	0.006
RV	464137	89221	38560	6605	1310	268	220	8403	0.014
VE	389898	75412	34660	5269	0	0	0	5269	0.010
TT	6637682	1386816	634810	479215	61324	12203	24178	576920	0.062

YEAR 2000 PREDICTED MODE SHARES (HBWORK TRIPS) --- UFARE8									
	DA	SR2	SR3+	WLK	PND	PNP	KNR	TOT (TRN)	SHR (TRN)
LA	3844366	839118	35280	302237	50144	10402	21068	383851	0.071
OR	1742405	347654	154851	13757	2916	538	406	17617	0.008
SB	351520	66257	25240	2497	0	0	0	2497	0.006
RV	468086	90718	36786	3490	900	190	138	4718	0.008
VE	391660	76166	32905	4502	0	0	0	4502	0.009
TT	6798037	1419913	605062	326483	53960	11130	21612	413185	0.045

TABLE 12.2 COMPARISON OF MODE CHOICE --- HOOOOW TRIPS

YEAR 2000 PREDICTED MODE SHARES (HOOOOW TRIPS) --- FARE00									
	HO-AUT	HO-TRN	OO-AUT	OO-TRN	OW-AUT	OW-TRN	HOW-AUT	HOW-TRN	SHR(TRN)
LA	14748629	764849	5538315	136669	2416030	79643	22702974	981161	0.041
OR	5366789	40899	2506798	17837	911115	8003	8784702	66739	0.008
SB	1420252	3139	834623	1930	288911	620	2543786	5689	0.002
RV	1827967	6882	1070676	4026	378329	1526	3276972	12434	0.004
VE	1577509	7301	587445	1934	228422	798	2393376	10033	0.004
TT	24941146	823070	10537857	162396	4222807	90590	39701810	1076056	0.026

YEAR 2000 PREDICTED MODE SHARES (HOOOOW TRIPS) --- UFARE8									
	HO-AUT	HO-TRN	OO-AUT	OO-TRN	OW-AUT	OW-TRN	HOW-AUT	HOW-TRN	SHR(TRN)
LA	15136923	376553	5604825	70160	2457640	38033	23199388	484746	0.020
OR	5383535	24152	2511794	12841	913660	5456	8808989	42449	0.005
SB	1419629	3762	835043	1510	289043	488	2543715	5760	0.002
RV	1831417	3432	1071678	3023	378745	1110	3281840	7565	0.002
VE	1580273	4538	587899	1480	228611	609	2396783	6627	0.003
TT	25351777	412437	10611239	89014	4267699	45696	40230715	547147	0.013

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