Determination of Choice Set for Non Work Trips in RELU from SCAG Data

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Data Files

- Household (16,939)
- Person (40,376)
- Vehicle (30,274)
- Place (190,169)
- Origin-Destination
- Linked Trip File
- Location File (100,313)

Households

- The definition of a "completed" household
  - all household members provided travel data if the household had 1 to 3 persons in it or
  - all but one household member provided travel data if the household had at least 4 persons in it.
  - In addition to all members providing travel data, the contractual requirement of the project also required that all household address be geocoded and 60% of all non-home/non-work addresses also be geocoded.

Households

County	Frequency	Percent (SCAG)	PERCENT (CENSUS)
Imperial	915	5.4	0.731162
Los Angeles	7,262	42.9	58.17839
Orange	2,316	13.7	17.36357
Riverside	2,341	13.8	9.397918
San Bernardino	2,172	12.8	9.813327
Ventura	1,933	11.4	4.51563
Total	**16,939**	**100.0**	100

Household

```
INCOME      Total 2000 annual household income
            Value    Label
              1      Less than $10,000
              2      $10,000 to $24,999
              3      $25,000 to $34,999
              4      $35,000 to $49,999
              5      $50,000 to $74,999
              6      $75,000 to $99,999
              7      $100,000 to $149,999
              8      $150,000 or more
              9      DK/RF
```

INCOME	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	962	5.68	962	5.68
2	2424	14.31	3386	19.99
3	1938	11.44	5324	31.43
4	2173	12.83	7497	44.26
5	3318	19.59	10815	63.85
6	1897	11.20	12712	75.05
7	1393	8.22	14105	83.27
8	773	4.56	14878	87.83
9	2061	12.17	16939	100.00

Households

Household Size	Frequency	Percent
1	5108	30.16
2	5929	35
3	2393	14.13
4	2045	12.07
5	946	5.58
6	362	2.14
7	109	0.64
8	37	0.22
9	10	0.06

Households

Median Household Trips by Income Category

```
INCOME     Total 2000 annual household income
           Value     Label
           1         Less than $10,000
           2         $10,000 to $24,999
           3         $25,000 to $34,999
           4         $35,000 to $49,999
           5         $50,000 to $74,999
           6         $75,000 to $99,999
           7         $100,000 to $149,999
           8         $150,000 or more
           9         DK/RF
```

DAY	Monday	Tuesday	Wednesday	Thursday	Friday	All
INCOME						
1	2	2	2.5	2	2	2
2	3	3	3	3	3	3
3	3	3	3	4	4	3
4	3	4	3	4	3.5	4
5	3.5	4	4	4	4	4
6	4	4	4	3	4	4
7	4	4	4	3	4	4
8	4	4	5	4	2.5	4
9	3	3	4	2	3	3
All	3	4	3	3	4	3
	Household Size = 1					

Households

Median Household Trips by Income Category

```
INCOME     Total 2000 annual household income
           Value    Label
           1        Less than $10,000
           2        $10,000 to $24,999
           3        $25,000 to $34,999
           4        $35,000 to $49,999
           5        $50,000 to $74,999
           6        $75,000 to $99,999
           7        $100,000 to $149,999
           8        $150,000 or more
           9        DK/RF
```

DAY	Monday	Tuesday	Wednesday	Thursday	Friday	All
INCOME						
1	4	6	4.5	4	4	4
2	4	4	4	4	4	4
3	6	6	6	6	5.5	6
4	6	7	6	6	6	6
5	6	6	6	6.5	6	6
6	6.5	7	8	7	6	7
7	7	8	7	7	7	7
8	5	6.5	6.5	7	7	6
9	5	6	6	5	6	6
All	6	6	6	6	6	6
	Household Size = 2					

Households

```
INCOME      Total 2000 annual household income
            Value     Label
              1       Less than $10,000
              2       $10,000 to $24,999
              3       $25,000 to $34,999
              4       $35,000 to $49,999
              5       $50,000 to $74,999
              6       $75,000 to $99,999
              7       $100,000 to $149,999
              8       $150,000 or more
              9       DK/RF
```

DAY	Monday	Tuesday	Wednesday	Thursday	Friday	All
INCOME						
1	8	10	12	13	7	10
2	10	10	11.5	11	12	11
3	10	8	11	11	10	10
4	12	12	16.5	13	11	12
5	14	14	13.5	13	12	13
6	14	13	15	14	12	14
7	17	15	14	17	13	15
8	13	14	12.5	12.5	15	13
9	12	12	10	9.5	10	11
All	12	12	13	12	12	12
		Household Size = 4				

Person

EMPLY	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	19555	61.48	19555	61.48
2	12037	37.84	31592	99.32
9	216	0.68	31808	100.00

EMPLY = EMPLOYMENT STATUS (IF AGE > 15)
1 = EMPLOYED
2 = UNEMPLOYED

Person

			Cumulative	Cumulative
PRIMACT	Frequency	Percent	Frequency	Percent
1	5225	43.41	5225	43.41
2	872	7.24	6097	50.65
3	2332	19.37	8429	70.03
4	3087	25.65	11516	95.67
7	329	2.73	11845	98.40
9	192	1.60	12037	100.00

PRIMACT = LIFE STATUS (IF AGE>15 AND UNEMPLOYED)
1 = RETIRED   2 = DISABILITY STATUS   3 = HOMEMAKER   4 = UNEMPLOYED   7 = OTHER   9 = DON'T KNOW

Survey Trip

- A Survey Trip is defined as travel by a person from one location to another.
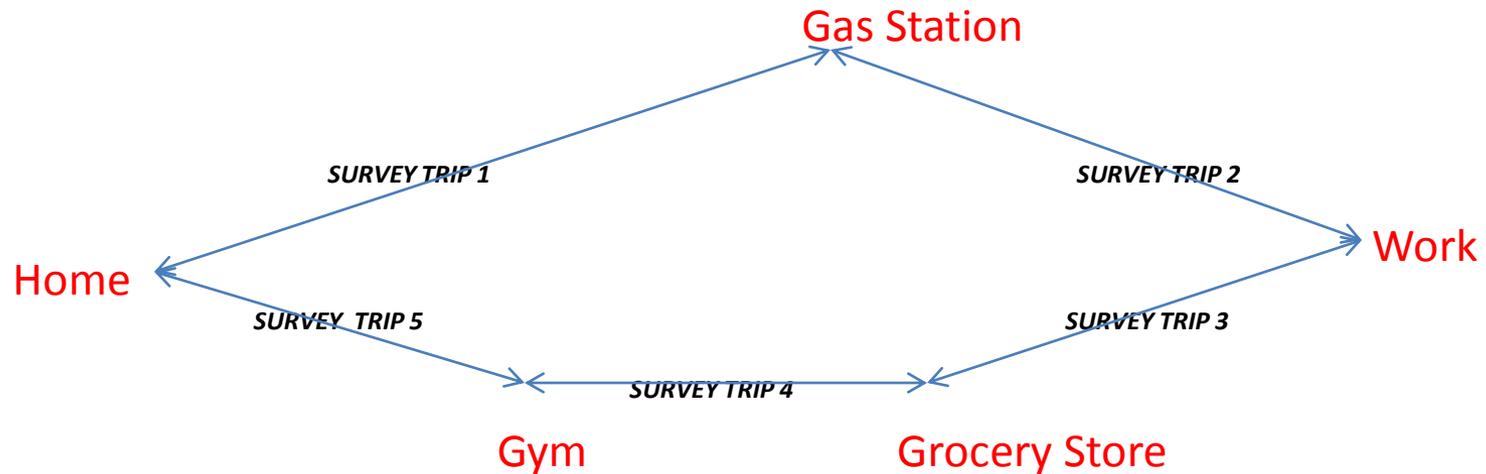
Trip Purpose

- TRP_ACT1 is a survey variable that has 26 categories.

- TRIP_PURPOSE = TRP_ACT1 aggregated to 6 categories*

SHOPPING PLUS = ATM, BUY GAS, QUICK STOP FOR COFFEE NEWSPAPER ETC, SHOPPING, BANKING, POST OFFICE, PAY BILLS, EAT MEAL (RESTAURANT, DRIVE THROUGHS, ETC), MEDICAL, FITNESS   ACTIVITY, RECREATIONAL, ENTERTAINMENT.

PERSONAL = CHILDCARE, DAYCARE, AFTER SCHOOL CARE, VISIT FRIENDS, RELATIVES, COMMUNITY MEETINGS,   POLITICAL/ CIVIC EVENTS, PUBLIC HEARING, OCCASIONAL VOLUNTEER WORK, CHURCH, TEMPLE,   RELIGIOUS MEETING, WITH ANOTHER PERSON AT THEIR ACTIVITY OUT OF HOME, OTHER AT   HOME ACTIVITIES, OTHER ACTIVITY.

TRANSPORTATION RELATED = CHANGE MODE OF TRANSPORTATION, PICK UP SOMEONE OR DROP OFF SOMEONE.

WORK = WORK, WORK RELATED, WORKING AT HOME.

SCHOOL = SCHOOL, OTHER SCHOOL ACTIVITIES.

DON'T KNOW

Survey Trip

	FLOW								
	ColPctSum								
INCOME	1	2	3	4	5	6	7	8	All
TRIP_PURPOSE									
DONT KNOW	0.41	0.14	0.08	0.2	0.17	0.26	0.18	0.12	0.18
PERSONAL	50.14	48.17	46.91	45.17	45.27	43.48	41.47	41.59	45.13
SCHOOL	7.56	5.99	5.33	4.18	4.1	3.9	3.65	3.49	4.55
SHOPPING PLUS	20.2	21.04	23.52	24.5	25.3	25.16	27.05	27.47	24.49
TRANSPORTATION RELATED	14.93	14.47	11.97	12.34	10.57	10.5	9.76	10.46	11.6
WORK	6.76	10.18	12.19	13.6	14.59	16.71	17.89	16.88	14.06
All	100	100	100	100	100	100	100	100	100

FLOW is a variable that takes value 1. This table shows the distribution of survey trips by trip purpose for each income category.

Survey Trip

INCOME	FLOW ColPctSum	1	2	3	4	5	6	7	8	All
MODE										
-9999	MISSING	0	0	0	0.01	0	0	0	0	0
1	WALK	20.55	16.6	10.2	6.84	4.65	4.42	4.1	4.5	7.83
2	BICYCLE	1.28	0.67	0.73	0.56	0.55	0.41	0.52	0.4	0.59
3	DROVE	39.86	50.32	59.93	65.66	68.47	70.9	73.05	71.92	64.44
4	PASSENGER IN CAR/TRUCK/VAN	26.87	25.69	25.07	24.1	24.19	22.41	20.84	21.26	23.77
5	LOCAL BUS OR COMMUNITY BUS	6.42	3.67	1.61	1.04	0.45	0.25	0.11	0.12	1.28
6	EXPRESS BUS	0.36	0.08	0.04	0.05	0.04	0.01	0.04	0.01	0.05
7	METRO BLUE LINE	0.25	0.09	0.05	0.05	0.02	0.1	.	0.01	0.06
8	METRO GREEN LINE	0.02	0.02	0.01	.	0	0.02	0.01	0.01	0.01
9	METRO RED LINE	0.11	0.07	0.12	0.12	0.05	0.03	0.03	0.07	0.07
10	COMMUTER RAIL	0.04	0.08	0.01	0.03	0.05	0.08	0.12	0.16	0.06
11	DIAL A RIDE/PARATRANSIT	0.14	0.07	0.01	0.01	.	.	0.01	.	0.02
12	SCHOOL BUS	1.94	1.75	1.59	0.87	0.93	0.89	0.49	0.59	1.08
13	GREYHOUND BUS	0.02	0.01	.	0.03	0.01	0.01	.	.	0.01
14	TAXI/SHUTTLE BUS/LIMOUSINE	0.46	0.25	0.15	0.23	0.09	0.1	0.1	0.28	0.17
15	MOTORCYCLE/MOPED	0.07	0.05	0.03	0.04	0.03	0.06	0.14	.	0.05
97	OTHER	1.41	0.47	0.33	0.22	0.37	0.25	0.33	0.56	0.39
99	DON'T KNOW	0.21	0.13	0.12	0.14	0.12	0.08	0.11	0.11	0.12
All		100	100	100	100	100	100	100	100	100

FLOW is a variable that takes value 1. This table shows the distribution of survey trips by mode of survey trip for each income category.

Survey Trip

Median Activity Duration

	ACTDUR								
	Median								
INCOME	1	2	3	4	5	6	7	8	All
TRIP_PURPOSE									
DONT KNOW	28	409	270	425	320	300	365	539	324
PERSONAL	404	365	360	332	330	315	315	329	335
SCHOOL	393.5	405	398.5	395	390	395	390	400	395
SHOPPING PLUS	45	39	32	30	33	35	35	35	35
TRANSPORTATION RELATED	5	5	5	5	5	5	5	5	5
WORK	480	450	420	358	360	335	300	270	360
All	280	270	255	233	239	235	210	216	240

ACTDUR is activity duration (time in minutes) at each place visited by a respondent. This table shows the median activity duration by survey trip purpose and income category.

Location

- For each address referenced during the course of the study, a unique location number is assigned
  - Each location is Geocoded to its nearest census tract
  - 100,313 addresses geocoded to nearest census tract.

Model Trip

- A Model Trip is defined as travel by a person that starts and ends at home.

Gas Station

SURVEY TRIP 1

SURVEY TRIP 2

Home

Work

SURVEY TRIP 5

SURVEY TRIP 3

SURVEY TRIP 4

Gym

Grocery Store
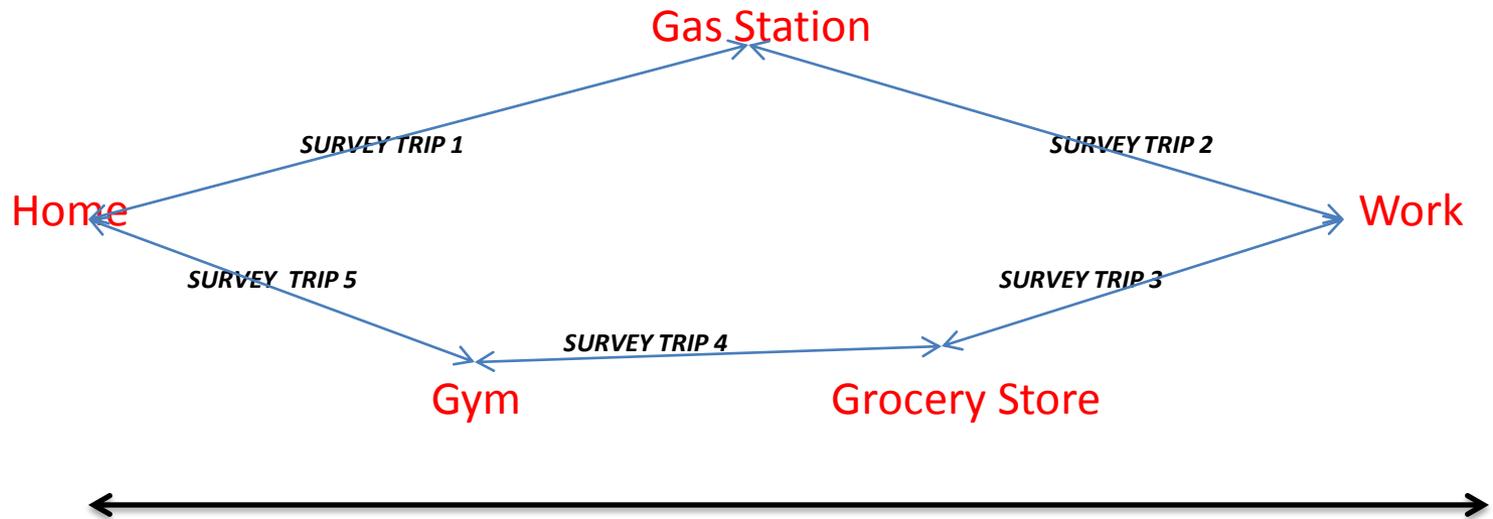
This set of survey trips that begin and end at home comprise a **MODEL TRIP**
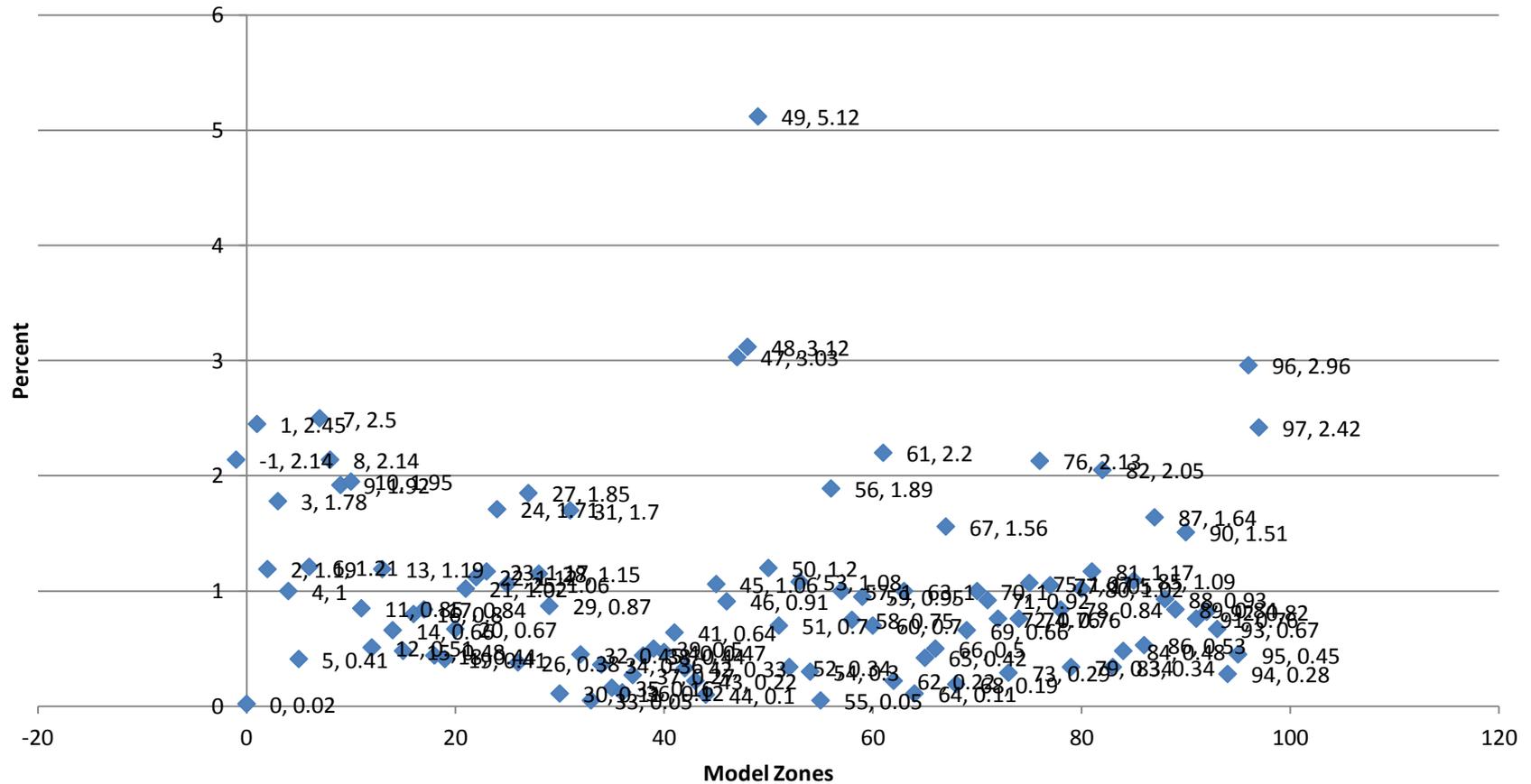
Survey Tour to Model Trip

- The first problem is to aggregate a set of survey trips (tour) into a model trip

  - Survey trip is defined as travel by a person in a household from point A (home, work, school, others) to point B (home, work, school, others).

  - Model trip starts at home and ends at home, with person visiting one place per trip.

Survey Tour to Model Trip

- Assign each location visited a model zone number.
- Santa Barbara team linked census tracts to model zones
  - Most census tracts belong to one model zone
  - Some census tract split between two zones
- Ignore census tract split
  - Split census tracts belong to model zone with majority share

Survey Tour to Model Trip

Distribution of Households by Model Zones

Survey Tour to Model Trip

- Model Zone 49 has the highest share of households – 5.12%

- Model zone 0 has the lowest share – 0.02%

- 362 households (2.14%) cannot be linked to any model zones

Survey Tour To Model Trip

- Trip Data from Survey for one person

Obs	PLANO	PTYPE	TRP_ACT1	MODEL_ ACTDUR	TRPDUR	DISTANCE	MODEL_ TRIP
12	1	1	24	0	0	0.00000	1
13	2	7	12	25	15	0.98477	1
14	3	7	3	1	10	2.41009	1
15	4	1	17	0	14	0.00000	1
16	5	7	3	15	24	8.55619	2
17	6	1	24	0	25	0.00000	2
18	7	7	2	5	5	2.41009	3
19	8	7	12	18	10	0.98477	3
20	9	7	3	2	7	2.41009	3
21	10	7	6	10	8	0.98477	3
22	11	1	24	0	15	0.00000	3
23	12	7	14	5	20	2.41009	4
24	13	1	24	0	10	0.00000	4

PLANO = PLACE NUMBER (Shows that the person visited 13 places)

PTYPE = WHERE THEY WENT , 1 = HOME   7 = OTHER PLACE

TRP_ACT1 = PRIMARY TRIP PURPOSE, 2 = PICK UP OR GET PICKED UP 3 = DROP OFF OR GET DROPPED OFF   6 = BANKING, POST OFFICE, PAY BILLS
                    12 = EAT MEAL   14 = FITNESS ACTIVITY   17 = VISIT FRIENDS/RELATIVES 24 = OTHER AT HOME ACTIVITIES

MODEL_ACTDUR = ACTIVITY DURATION [Activity duration at home (if not working) and change of mode set to zero]

TRPDUR = TRIP DURATION

DISTANCE = DISTANCE BETWEEN HOME AND PLACE VISITED

MODEL TRIP = A SERIES OF SURVEY TRIPS THAT BEGIN AND END AT HOME

Survey Tour to Model Trip

- Pick place with highest activity duration in survey tour as destination for model trip.

- A set of survey trips that began at home and ends at home is converted into model trips for each person reporting trips in the survey data set.

Survey Tour To Model Trip

- Aggregation of survey trips into model trip for same person shown earlier

Obs	MODEL_ TRIP	TRIP_PURPOSE	MODEL_ ACTDUR	TOUR_ TIME	TOUR_ STOPS	DISTANCE
3	1	SHOPPING PLUS	25	39	2	0.98477
4	2	TRANSPORTATION RELATED	15	49	1	8.55619
5	3	SHOPPING PLUS	18	45	4	0.98477
6	4	SHOPPING PLUS	5	30	1	2.41009

TRIP_PURPOSE is either work or school or shopping plus or personal. This variable is arrived at after aggregating TRP_ACT1 into 4 categories.

TOUR_TIME is total time taken to complete the model trip. This variable is computed by aggregating the trip times in a model trip.

TOUR_STOPS is the number of stops in a survey tour.

DISTANCE is the distance between home and model trip destination. Model trip destination is the place with the maximum activity duration in a survey tour.

Model Trip

INCOME	FLOW								
	ColPctSum								
INCOME	1	2	3	4	5	6	7	8	All
TRIP_PURPOSE									
DONT KNOW	0.2	0.02	0.04	0.02	0.07	0.11	0.11	.	0.06
PERSONAL	22.79	19.33	18.93	18.63	18.33	15.41	15.01	14.9	17.79
SCHOOL	19.92	15.95	13.97	11.32	10.93	10.41	10.02	9.92	12.24
SHOPPING PLUS	27.8	27.68	28.31	28.97	29.13	29.87	30.25	31.23	29.1
TRANSPORTATION RELATED	13.16	14.22	12.25	11.55	10.01	9.04	7.39	9.47	10.79
WORK	16.13	22.8	26.5	29.52	31.54	35.17	37.23	34.48	30.02
All	100	100	100	100	100	100	100	100	100

FLOW is a variable that takes value 1. This table shows the distribution of model trips by trip purpose for each income category.

Model Trip

INCOME		FLOW ColPctSum								
		1	2	3	4	5	6	7	8	All
MODE										
1	WALK	21.61	17.77	11.07	6.95	4.96	4.75	4.24	4.53	8.43
2	BICYCLE	1.59	0.81	0.86	0.7	0.72	0.55	0.66	0.53	0.74
3	DROVE	39.53	48.63	57.55	64.21	66.5	68.91	70.86	69.78	62.35
4	PASSENGER IN CAR/TRUCK/VAN	26.88	26.73	26.14	25.43	25.49	23.77	22.46	23.27	25.09
5	LOCAL BUS OR IN COMMUNITY BUS	4.86	2.37	1.35	0.78	0.36	0.2	0.11	0.11	0.96
6	EXPRESS BUS	0.41	0.1	0.06	0.02	0.05	0.02	0.11	.	0.07
7	METRO BLUE LINE	0.15	0.05	.	0.03	.	0.03	.	.	0.02
8	METRO GREEN LINE	.	.	.	.	0.01	.	.	.	0
9	METRO RED LINE	.	0.03	0.06	0.05	0.03	0.02	0.02	0.08	0.03
10	COMMUTER RAIL	.	0.08	.	.	0.03	0.03	0.04	.	0.03
11	DIAL A RIDE/PARATRANSIT	0.15	0.06	0.02	0.02	.	.	.	.	0.02
12	SCHOOL BUS	2.71	2.39	2.08	1.17	1.23	1.11	0.58	0.75	1.44
13	GREYHOUND BUS	0.05	.	.	0.02	0.02	0.02	.	.	0.01
14	TAXI/SHUTTLE BUS/LIMOUSINE	0.51	0.31	0.19	0.19	0.08	0.09	0.13	0.3	0.18
15	MOTORCYCLE	0.1	0.06	0.04	0.03	0.04	0.06	0.13	.	0.06
97	OTHER	1.08	0.52	0.49	0.21	0.35	0.36	0.49	0.49	0.43
99	DON'T KNOW	0.36	0.1	0.11	0.19	0.13	0.08	0.17	0.15	0.14
All		100	100	100	100	100	100	100	100	100

FLOW is a variable that takes value 1. This table shows the distribution of model trips by mode of survey trip for each income category.

Model Trip

Median Model Activity Duration

	MODEL_ACTDUR								
	Median								
INCOME	1	2	3	4	5	6	7	8	All
TRIP_PURPOSE									
DONT KNOW	202.5	248	249	235	76	45	135	.	80
PERSONAL	155	120	115	120	123	110	110	128	120
SCHOOL	401	405	405	405	397	401.5	405	410	404
SHOPPING PLUS	63	55	60	58.5	60	60	60	65	60
TRANSPORTATION RELATED	5	5	10	10	9	10	8	10	8
WORK	510	500	495	495	490	483.5	480	440	490
All	165	160	169.5	155	171	195	190	180	175

ACTDUR is activity duration (time in minutes) at each place visited by a respondent. This table shows the median activity duration by model trip purpose and income category.

Model Trip

TOUR_STOPS	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	625	1.28	625	1.28
1	27366	56.02	27991	57.30
2	9878	20.22	37869	77.52
3	5648	11.56	43517	89.08
4	2399	4.91	45916	93.99
5	1333	2.73	47249	96.72
6	682	1.40	47931	98.12
7	399	0.82	48330	98.94
8	217	0.44	48547	99.38
9	116	0.24	48663	99.62
10	58	0.12	48721	99.74
11	48	0.10	48769	99.83
12	27	0.06	48796	99.89
13	18	0.04	48814	99.93
14	7	0.01	48821	99.94
15	9	0.02	48830	99.96
16	8	0.02	48838	99.98
17	3	0.01	48841	99.98
19	5	0.01	48846	99.99
20	1	0.00	48847	99.99
22	1	0.00	48848	100.00
23	1	0.00	48849	100.00
28	1	0.00	48850	100.00

Model Trip

REGION	FLOW ColPctSum IMPERIAL	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO	VENTURA	All
TOUR TIME (MINUTES)							
0_10	16.82	9.06	9.71	10.8	11.73	12.66	10.59
10_20	18.66	14.83	16.08	15.54	16.18	18.91	15.96
20_30	17.59	15.78	17.62	17.52	15.1	18.39	16.6
30_40	10.45	11.37	12.07	10.98	11.05	11.3	11.31
40_50	8.45	9.56	8.9	9.45	8.59	7.65	9.05
50_60	6.76	8.21	8.69	8.04	8.26	7.72	8.12
60_MORE	21.27	31.18	26.94	27.66	29.09	23.36	28.36
All	100	100	100	100	100	100	100

TOUR_TIME is the total time taken to complete a survey trip. Only Shopping Plus and Personal Trips Included

Model Trip

REGION	FLOW ColPctSum IMPERIAL	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO	VENTURA	All
DISTANCE BETWEEN MODEL TRIP ORIGIN AND DESTINATION IN MILES							
.	16.21	9.78	9.71	10.2	8.66	10.7	10.15
0_1	28.34	20.03	16.77	16.47	17.86	16.92	18.89
1_2	17.36	16.14	18.25	12.27	14.29	15.41	15.64
2_3	3.76	10.45	12.7	11.34	9.98	12.25	10.67
3_4	4.22	7.34	7.15	8.67	7.58	8.4	7.48
4_5	3.3	5	5.22	5.31	5.43	5.35	5.08
5_7	5.22	7.1	7.48	8.4	7.58	6.52	7.23
7_9	4.61	4.32	4.83	5.31	4.42	4.14	4.54
9_11	2.92	3.14	2.96	3.51	2.73	3.09	3.09
11_13	4.99	2.06	1.6	2.34	3.13	2.37	2.37
13_15	4.3	1.75	1.6	2.34	1.92	1.02	1.9
15_20	0.69	3.75	2.26	2.7	4.04	2.26	3.09
20_25	0.54	2.25	2.17	1.35	1.72	1.39	1.85
25_30	0.69	1.65	1.87	1.05	1.52	1.21	1.47
30_50	0.77	2.7	3.53	2.82	3.88	2.45	2.85
50_MORE	2.07	2.52	1.9	5.91	5.26	6.52	3.7
All	100	100	100	100	100	100	100

*Only Shopping Plus and Personal Trips Included

Determination of Choice Set

Model Zone 1
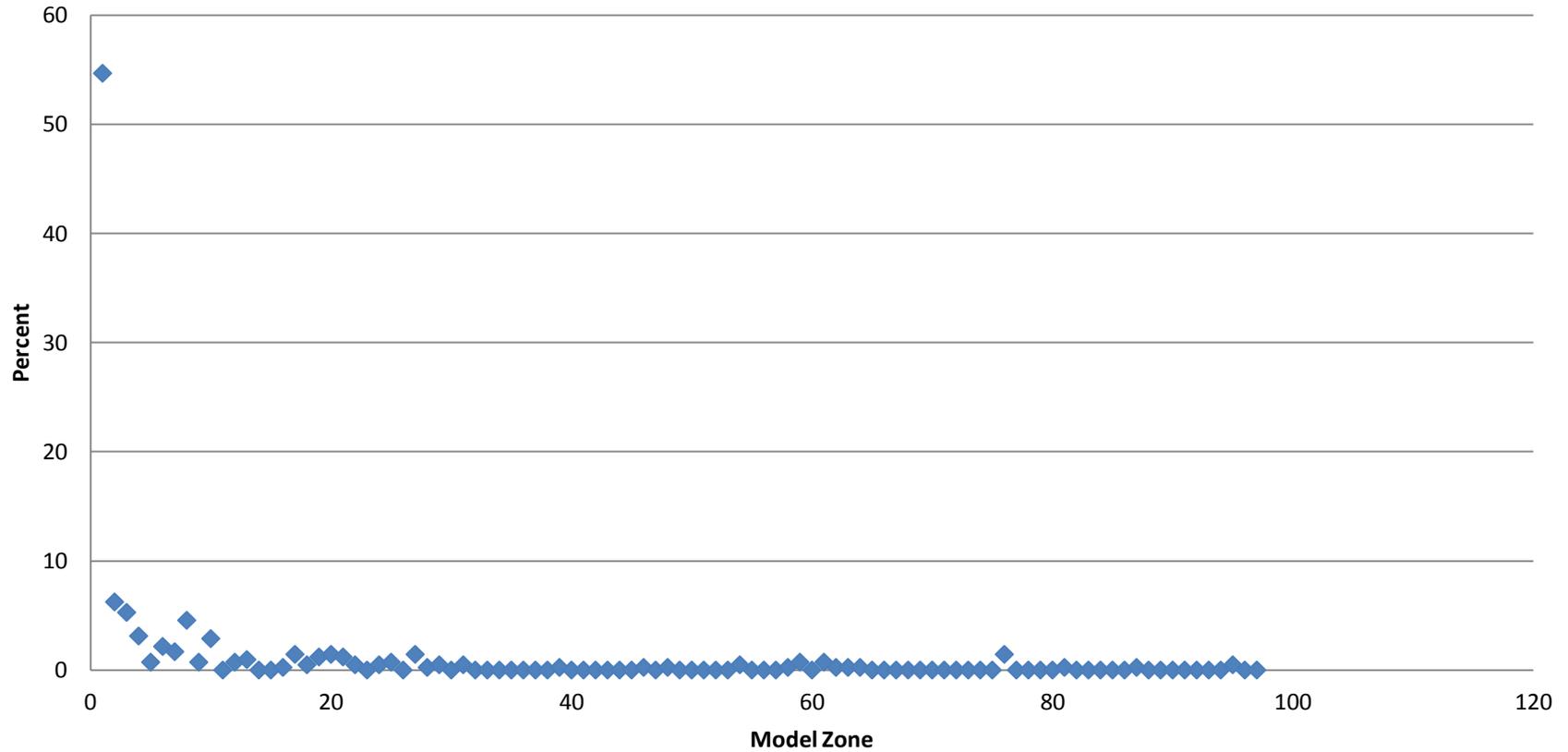
Determination of Choice set

- We drop model zones from the choice set that take up the bottom 5% share of non work trips from model zone 1.

- We distribute these 5% trips between the remaining model zones by dividing each model zones original share by 95%. This ensures that the sum of the shares add up to 100%.

MZ	MZ_HOME11	CUMTRIP1	MZ_TRIP1	CUMTRIP11
1	0.55	1	0.57	1
2	0.06	0.45	0.07	0.43
3	0.05	0.39	0.06	0.36
4	0.03	0.29	0.03	0.26
5	0.01	0.10	0.01	0.05
6	0.02	0.23	0.02	0.20
7	0.02	0.21	0.02	0.17
8	0.05	0.34	0.05	0.31
9	0.01	0.07	0.01	0.02
10	0.03	0.26	0.03	0.23
12	0.01	0.10	0.01	0.06
13	0.01	0.11	0.01	0.07
17	0.01	0.15	0.02	0.11
18	0.00	0.06	0.01	0.02
19	0.01	0.12	0.01	0.08
20	0.01	0.19	0.02	0.16
21	0.01	0.14	0.01	0.10
24	0.00	0.06	0.01	0.01
25	0.01	0.07	0.01	0.03
27	0.01	0.18	0.02	0.14
54	0.00	0.05	0.01	0.01
59	0.01	0.08	0.01	0.04
61	0.01	0.09	0.01	0.05
76	0.01	0.17	0.02	0.13

Some Other Model Zones

- Model Zone 45
  - 1,2,4,16,25,45 (85%), 61
- Model Zone 75
  - 16,61,63,66,69,71,72,73,74,75(39%),77,78,82,86, 87,89
- Model Zone 97
  - 96,97 (87%)