APPENDIX D. RESIDENTIAL AND FIRM LOCATION CHOICE MODEL SPECIFICATION AND ESTIMATION

This document summarizes the latest location choice estimation for Greater Boston Land Use model. It contains residential location choice, residential rent model, and firm location choice model. The residential location choice and rent models are updated on Dec 14, 2015. The firm location choice models are updated on May 2, 2016. They are implemented in Cube Land for the Greater Boston Integrated Transport and Land Use model (BosLUT).

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1. Residential location choice model

1.1 Specification

Bidding = log(rooms)+is_mf+I(Jobs_tot_PT_AM / Jobs_tot_AUTO_AM)+ Acc_HH1 +Acc_HH8 + Acc_HH11 + pop_den + race+ log(mid_inc)

1.2 Variables

-rooms: number of rooms of housing unit
-is_mf: multi-family
-(Jobs_tot_PT_AM / Jobs_tot_AUTO_AM): Ratio of transit accessibility to total jobs to auto accessibility to total jobs (accessibility measured by cross-product of jobs and friction factor)
-Acc_HH1, Acc_HH8, Acc_HH11: accessibility to group 1, 8, 11
-pop_den: zonal population density (people/ha)
-race: white people ratio
-mid_inc: zonal median income/1000

1.3 Variables that have been tried but are not significant in the bidding function:
- SAT score
- FAR: average floor area ratio in the zone
- Share of Recreational Space
- Share of Conservative Space
- Distance to Recreational Space
- Distance to Recreational Space
- Distance to coast/ dummy variable if the zone is adjacent to the coast
- Zonal employment density

- Distance to MBTA station/dummy variable if the distance to T is less than 1km
- Many measures of accessibility, including
   ~ accessibility to downtown jobs by auto
   ~ accessibility to all households by auto
   ~ many other decay functions/travel times/combinations

1.4 Group definition

Agent ID	obs.	Description
1	73	Young (15-34), low inc, size<=2
2	111	Young (15-34), low inc, size>=3
3	123	Young (15-34), high inc, size<=2
4	107	Young (15-34), high inc, size>=3
5	646	Mid-age (35-64), low inc, size<=2
6	913	Mid-age (35-64), low inc, size>=3
7	1284	Mid-age (35-64), high inc, size<=2
8	1382	Mid-age (35-64), high inc, size>=3
9	440	Old (65+), low inc, size<=2
10	84	Old (65+), low inc, size>=3
11	318	Old (65+), high inc, size<=2
12	35	Old (65+), high inc, size>=3

1.5 Result 1- didn't fix non-significant coefficients:

(file: share_LU model/Estimation/Residential/201511214_Finals/
model_17_Accs+den~2.html)

Number of estimated parameters: 110
Number of observations: 5119
Number of individuals: 5119
Null log-likelihood: -12720.237
Cte log-likelihood: -10283.881
Init log-likelihood: -16912.941
Final log-likelihood: -9578.471
Likelihood ratio test: 6283.533
Rho-square: 0.247
Adjusted rho-square: 0.238
Final gradient norm: +1.031e-03
Diagnostic: Iterations are stucked
Iterations: 189
Run time: 07:12

Table 1 Model Estimation Results

Name	Value	Rob. std err	Rob. t-test	Rob. p-val	
ASC_1	0				
ASC_10	-1.87	2.41	-0.78	0.44	*
ASC_11	-7	1.93	-3.63	0	
ASC_12	-10.2	3.58	-2.86	0	
ASC_2	0.354	2.05	0.17	0.86	*
ASC_3	-0.849	1.97	-0.43	0.67	*
ASC_4	-7.72	2.22	-3.48	0	
ASC_5	3.22	1.66	1.94	0.05	*
ASC_6	-0.126	1.71	-0.07	0.94	*
ASC_7	-2.41	1.7	-1.42	0.16	*
ASC_8	-9.34	1.77	-5.29	0	
ASC_9	0.457	1.74	0.26	0.79	*
bAccTot_PA_ratio1	0				
bAccTot_PA_ratio10	15.4	11.9	1.3	0.2	*
bAccTot_PA_ratio11	21.6	9.36	2.31	0.02	
bAccTot_PA_ratio12	34.1	12.5	2.73	0.01	
bAccTot_PA_ratio2	5.66	12	0.47	0.64	*
bAccTot_PA_ratio3	11.9	10.2	1.16	0.25	*
bAccTot_PA_ratio4	26.8	10.2	2.64	0.01	
bAccTot_PA_ratio5	18.4	9.07	2.03	0.04	
bAccTot_PA_ratio6	19	9.21	2.07	0.04	
bAccTot_PA_ratio7	27.4	8.88	3.08	0	
bAccTot_PA_ratio8	20.8	9.32	2.23	0.03	
bAccTot_PA_ratio9	11.9	9.7	1.22	0.22	*
bAcc_HH11_1	0				
bAcc_HH11_10	-0.00772	0.0282	-0.27	0.78	*
bAcc_HH11_11	0.0303	0.0217	1.4	0.16	*
bAcc_HH11_12	0.0528	0.0222	2.38	0.02	
bAcc_HH11_2	0.022	0.0222	0.99	0.32	*
bAcc_HH11_3	0.0136	0.024	0.57	0.57	*
bAcc_HH11_4	0.0377	0.0229	1.65	0.1	*
bAcc_HH11_5	0.0194	0.0206	0.94	0.35	*
bAcc_HH11_6	0.0103	0.021	0.49	0.62	*
bAcc_HH11_7	0.0243	0.0206	1.18	0.24	*
bAcc_HH11_8	0.000478	0.0209	0.02	0.98	*
bAcc_HH11_9	0.027	0.021	1.29	0.2	*

bAcc_HH1_1	0				
bAcc_HH1_10	-0.0206	0.0186	-1.1	0.27	*
bAcc_HH1_11	-0.00962	0.0101	-0.96	0.34	*
bAcc_HH1_12	0.00458	0.0204	0.22	0.82	*
bAcc_HH1_2	-0.00767	0.0121	-0.63	0.53	*
bAcc_HH1_3	-0.00281	0.0102	-0.28	0.78	*
bAcc_HH1_4	-0.0149	0.0123	-1.21	0.23	*
bAcc_HH1_5	-0.0205	0.00938	-2.19	0.03	
bAcc_HH1_6	-0.0228	0.00974	-2.34	0.02	
bAcc_HH1_7	-0.0129	0.00876	-1.47	0.14	*
bAcc_HH1_8	-0.00786	0.00966	-0.81	0.42	*
bAcc_HH1_9	-0.0238	0.0107	-2.23	0.03	
bAcc_HH8_1	0				
bAcc_HH8_10	0.0196	0.0165	1.18	0.24	*
bAcc_HH8_11	-0.0172	0.015	-1.15	0.25	*
bAcc_HH8_12	-0.0021	0.0252	-0.08	0.93	*
bAcc_HH8_2	0.0244	0.0156	1.57	0.12	*
bAcc_HH8_3	-0.011	0.0162	-0.68	0.5	*
bAcc_HH8_4	-0.00166	0.0171	-0.1	0.92	*
bAcc_HH8_5	0.0134	0.014	0.95	0.34	*
bAcc_HH8_6	0.031	0.014	2.21	0.03	
bAcc_HH8_7	0.00103	0.0139	0.07	0.94	*
bAcc_HH8_8	0.0121	0.0141	0.86	0.39	*
bAcc_HH8_9	0.013	0.0143	0.91	0.36	*
bInc_log1	0				
bInc_log10	-0.116	0.546	-0.21	0.83	*
bInc_log11	1.7	0.423	4.01	0	
bInc_log12	0.424	0.699	0.61	0.54	*
bInc_log2	0.125	0.459	0.27	0.79	*
bInc_log3	0.0744	0.443	0.17	0.87	*
bInc_log4	1.02	0.477	2.14	0.03	
bInc_log5	-0.221	0.374	-0.59	0.55	*
bInc_log6	0.102	0.384	0.27	0.79	*
bInc_log7	0.927	0.382	2.43	0.02	
bInc_log8	1.43	0.394	3.64	0	
bInc_log9	0.39	0.396	0.98	0.32	*
bismf1	0				
bismf10	-2.76	0.643	-4.29	0	
bismf11	-1.45	0.388	-3.74	0	
bismf12	-0.716	0.856	-0.84	0.4	*
bismf2	-0.955	0.429	-2.23	0.03	
bismf3	-0.386	0.411	-0.94	0.35	*
bismf4	-0.95	0.445	-2.14	0.03	

bismf5	-1.03	0.355	-2.9	0	
bismf6	-1.53	0.357	-4.28	0	
bismf7	-1.23	0.35	-3.5	0	
bismf8	-1.77	0.361	-4.9	0	
bismf9	-1.56	0.367	-4.27	0	
bpop_den1	0				
bpop_den10	-0.00634	0.00771	-0.82	0.41	*
bpop_den11	-0.00386	0.00498	-0.78	0.44	*
bpop_den12	-0.024	0.0116	-2.07	0.04	
bpop_den2	-0.00303	0.00545	-0.56	0.58	*
bpop_den3	-0.0016	0.00512	-0.31	0.75	*
bpop_den4	-0.00361	0.00505	-0.72	0.47	*
bpop_den5	-0.00496	0.00418	-1.19	0.23	*
bpop_den6	-0.00544	0.00445	-1.22	0.22	*
bpop_den7	-0.0057	0.0041	-1.39	0.16	*
bpop_den8	-0.00458	0.00446	-1.03	0.31	*
bpop_den9	-0.00396	0.00453	-0.87	0.38	*
brace1	0				
brace10	-0.228	1.1	-0.21	0.84	*
brace11	0.638	0.934	0.68	0.49	*
brace12	0.183	1.81	0.1	0.92	*
brace2	-0.727	0.91	-0.8	0.42	*
brace3	1.83	0.982	1.87	0.06	*
brace4	1.34	1.03	1.3	0.19	*
brace5	0.255	0.81	0.32	0.75	*
brace6	1.05	0.821	1.28	0.2	*
brace7	0.48	0.813	0.59	0.55	*
brace8	1.03	0.827	1.24	0.21	*
brace9	0.0118	0.847	0.01	0.99	*
broom_log1	0				
broom_log10	1.96	0.616	3.18	0	
broom_log11	0.729	0.37	1.97	0.05	
broom_log12	4.08	0.881	4.62	0	
broom_log2	-0.0922	0.33	-0.28	0.78	*
broom_log3	-0.0493	0.322	-0.15	0.88	*
broom_log4	1.54	0.505	3.05	0	
broom_log5	-0.0115	0.267	-0.04	0.97	*
broom_log6	0.858	0.319	2.69	0.01	
broom_log7	0.736	0.312	2.36	0.02	
broom_log8	3.04	0.332	9.16	0	
broom_log9	0.0612	0.282	0.22	0.83	*

1.6 Result 2- fix non-significant coefficients

directory: share_LU
model/Estimation/Residential/20151229_fix_non_significant/model_18_Accs~9.html

Model: Logit	
Number of estimated parameters: 66	
Number of observations: 5119	
Number of individuals: 5119	
Null log likelihood: -12720.237	
Cte log likelihood: -10283.881	
Init log likelihood: -13052.925	
Final log likelihood: -9598.771	
Likelihood ratio test: 6242.932	
Rho-square: 0.245	
Adjusted rho-square: 0.240	
Final gradient norm: +4.546e-004	
Diagnostic: Normal termination. Obj: 6.05545e-006 Const: 6.05545e-006	
Iterations: 111	
Run time: 02:50	
Variance-covariance: from analytical hessian	
Sample file: Sample_Acc_FF_PA_20151214.dat	

Table 2 Model Estimation Results

Name	Value	Robust Std err	Robust t-test	p-value
ASC_1	0			
ASC_10	-2.72	1.06	-2.57	0.01
ASC_11	-7.93	1.12	-7.11	0
ASC_12	-12.9	3.03	-4.25	0
ASC_2	0			
ASC_3	-1.62	1.26	-1.29	0.2
ASC_4	-8.79	1.59	-5.53	0
ASC_5	2.39	0.205	11.65	0
ASC_6	-1.22	0.713	-1.72	0.09
ASC_7	-3.44	0.699	-4.92	0
ASC_8	-10.3	0.795	-12.94	0
ASC_9	-0.0992	0.757	-0.13	0.9
bAccTot_PA_ratio1	0			
bAccTot_PA_ratio10	4.11	7.3	0.56	0.57
bAccTot_PA_ratio11	7.6	3.77	2.02	0.04
bAccTot_PA_ratio12	8.44	10.5	0.8	0.42
bAccTot_PA_ratio2	0			
bAccTot_PA_ratio3	0.0478	4.35	0.01	0.99
bAccTot_PA_ratio4	10.6	4.56	2.32	0.02

bAccTot_PA_ratio5	4.59	2.97	1.55	0.12
bAccTot_PA_ratio6	0			
bAccTot_PA_ratio7	12.2	2.41	5.06	0
bAccTot_PA_ratio8	4.43	3.02	1.47	0.14
bAccTot_PA_ratio9	0			
bAcc_HH11_1	0			
bAcc_HH11_10	0			
bAcc_HH11_11	0.0283	0.00884	3.21	0
bAcc_HH11_12	0.0514	0.0124	4.14	0
bAcc_HH11_2	0			
bAcc_HH11_3	0.0217	0.011	1.98	0.05
bAcc_HH11_4	0.0314	0.0104	3.01	0
bAcc_HH11_5	0.0155	0.00682	2.27	0.02
bAcc_HH11_6	0.0109	0.00695	1.56	0.12
bAcc_HH11_7	0.0224	0.00594	3.77	0
bAcc_HH11_8	0			
bAcc_HH11_9	0.0213	0.00748	2.85	0
bAcc_HH1_1	0			
bAcc_HH1_10	-0.0253	0.0152	-1.66	0.1
bAcc_HH1_11	-0.00346	0.00521	-0.66	0.51
bAcc_HH1_12	0			
bAcc_HH1_2	0			
bAcc_HH1_3	0			
bAcc_HH1_4	0			
bAcc_HH1_5	-0.0164	0.00531	-3.1	0
bAcc_HH1_6	-0.0153	0.00473	-3.24	0
bAcc_HH1_7	-0.0089	0.00366	-2.43	0.01
bAcc_HH1_8	0			
bAcc_HH1_9	-0.0192	0.00664	-2.89	0
bAcc_HH8_1	0			
bAcc_HH8_10	0.0196	0.00887	2.21	0.03
bAcc_HH8_11	-0.0188	0.00661	-2.84	0
bAcc_HH8_12	0			
bAcc_HH8_2	0.0351	0.00519	6.76	0
bAcc_HH8_3	-0.0191	0.00891	-2.15	0.03
bAcc_HH8_4	0			
bAcc_HH8_5	0.0137	0.00433	3.16	0
bAcc_HH8_6	0.0271	0.0039	6.94	0
bAcc_HH8_7	0			
bAcc_HH8_8	0.00952	0.00405	2.35	0.02
bAcc_HH8_9	0.0145	0.00479	3.02	0
bInc_log1	0			
bInc_log10	0			

bInc_log11	2.03	0.219	9.27	0
bInc_log12	1.02	0.498	2.05	0.04
bInc_log2	0			
bInc_log3	0.595	0.257	2.31	0.02
bInc_log4	1.51	0.299	5.04	0
bInc_log5	0			
bInc_log6	0.571	0.139	4.1	0
bInc_log7	1.25	0.135	9.24	0
bInc_log8	1.85	0.154	12.01	0
bInc_log9	0.532	0.16	3.33	0
bismf1	0			
bismf10	-2.71	0.553	-4.9	0
bismf11	-1.44	0.287	-5.03	0
bismf12	-1.02	0.718	-1.42	0.15
bismf2	-0.883	0.246	-3.58	0
bismf3	-0.35	0.293	-1.19	0.23
bismf4	-1.02	0.345	-2.97	0
bismf5	-1.01	0.233	-4.32	0
bismf6	-1.55	0.242	-6.41	0
bismf7	-1.23	0.237	-5.19	0
bismf8	-1.8	0.25	-7.18	0
bismf9	-1.55	0.249	-6.24	0
bpop_den1	0			
bpop_den10	0			
bpop_den11	0			
bpop_den12	0			
bpop_den2	0			
bpop_den3	0			
bpop_den4	0			
bpop_den5	0			
bpop_den6	0			
bpop_den7	0			
bpop_den8	0			
bpop_den9	0			
brace1	0			
brace10	0			
brace11	0			
brace12	0			
brace2	0			
brace3	0			
brace4	0			
brace5	0			
brace6	0			

brace7	0			
brace8	0			
brace9	0			
broom_log1	0			
broom_log10	1.96	0.539	3.64	0
broom_log11	0.711	0.276	2.58	0.01
broom_log12	4.01	0.85	4.72	0
broom_log2	0			
broom_log3	0			
broom_log4	1.49	0.438	3.41	0
broom_log5	0			
broom_log6	0.806	0.194	4.16	0
broom_log7	0.717	0.192	3.74	0
broom_log8	3	0.22	13.68	0
broom_log9	0			

Coefficient in red: fixed

2. Residential Rent model

Updated: 20151205

2.1 Specification and result

Table 3 Model Estimation Results

	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	-2.69E+00	1.71E-01	-1.58E+01	< 2e-16	***
logSum	7.24E-01	1.54E-02	4.70E+01	< 2e-16	***
Jobs_tot_AUTO_AM	6.78E-09	3.36E-10	2.02E+01	< 2e-16	***
Rec_share	5.20E-01	1.13E-01	4.60E+00	4.38E-06	***
crime	-3.35E-01	6.21E-02	-5.39E+00	7.36E-08	***
SAT_ratio	1.08E+00	1.76E-01	6.14E+00	9.11E-10	***
mid_inc	5.32E-03	5.39E-04	9.86E+00	< 2e-16	***
race	6.57E-01	6.13E-02	1.07E+01	< 2e-16	***
FAR	1.58E-01	4.54E-02	3.48E+00	0.000504	***
data$dis_MBT <= 1000TRUE	2.29E-01	3.74E-02	6.13E+00	9.58E-10	***
Acc_HH_tot	-7.37E-04	1.12E-04	-6.59E+00	5.00E-11	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.6176 on 3772 degrees of freedom
Multiple R-squared: 0.5739, Adjusted R-squared: 0.5727

F-statistic: 507.9 on 10 and 3772 DF, p-value: < 2.2e-16

2.2 Variable explanation
- logSum: expected highest bid
- Jobs_tot_AUTO_AM: auto accessibility to total jobs during AM peak hour
- Rec_share: share of recreational space within the zone
- (COAST <= 2000: dummy variable that equals to 1 if the distance from zonal centriod to the coast is no greater than 2000)---taken out in this version
- crime: crime index = town-level (violate crime rate + 0.8*property crime rate)/max(violate crime rate + 0.8*property crime rate)
- SAT_ratio: SAT score of the school district/highest SAT score at school district level
- mid_inc: median zonal income
- race: white people ratio in the zone
- FAR: average floor area ratio in the zone
- dis_MBT: distance from TAZ centroid to closest MBTA
- Acc_HH_tot: accessibility to all households by auto during AM peak hour

2.3 Variables that have been tried but are not significant in rent model
- population density in the zone
- employment density in the zone
- distance to recreational space
- log form or dummy form of distance to MBTA/Recreational Space
- log form of median income

2.4 Other notes
-Acc_HH1, Acc_HH2, Acc_HH12 are significant in the rent model, but I didn't include because it's very hard to interpret why all people want to live close to group 1 and far from group 2, 12

2.5 Multi-collinearity check

Table 4 Correlation Matrix of Explanatory Variables

	logSum	Jobs_tot_ AUTO_AM	Rec_s hare	X.COAST. ...2000.	crime	SAT_r atio	mid_inc	race	FAR	X.data.d is_MBT. ...1000.	Acc_H H_tot
logSum	1.00	-0.57	0.05	-0.17	-0.43	0.32	0.46	0.42	-0.59	-0.44	0.14
Jobs_tot_AUTO_AM	-0.57	1.00	-0.04	0.17	0.53	-0.30	-0.23	-0.40	0.78	0.66	-0.08
Rec_share	0.05	-0.04	1.00	0.00	-0.07	0.07	0.08	0.10	-0.13	-0.02	0.05
X.COAST....2000.	-0.17	0.17	0.00	1.00	0.27	-0.22	-0.28	-0.13	0.27	0.20	0.10
crime	-0.43	0.53	-0.07	0.27	1.00	-0.69	-0.50	-0.61	0.55	0.42	-0.09
SAT_ratio	0.32	-0.30	0.07	-0.22	-0.69	1.00	0.58	0.49	-0.40	-0.22	0.00

mid_inc	0.46	-0.23	0.08	-0.28	-0.50	0.58	1.00	0.52	-0.36	-0.18	0.00
race	0.42	-0.40	0.10	-0.13	-0.61	0.49	0.52	1.00	-0.44	-0.30	0.10
FAR	-0.59	0.78	-0.13	0.27	0.55	-0.40	-0.36	-0.44	1.00	0.61	-0.04
X.data.dis_MBT....1000.	-0.44	0.66	-0.02	0.20	0.42	-0.22	-0.18	-0.30	0.61	1.00	-0.10
Acc_HH_tot	0.14	-0.08	0.05	0.10	-0.09	0.00	0.00	0.10	-0.04	-0.10	1.00

3. Firm location choice model

Updated: 20160502

3.1 Specification

B = acc_hwy + acc_pop + acc_emp + ind_den_1 + ind_den_2 + ind_den_6 + ind_den_11 + log(mid_inc+1) + SF_C + WareH + far + LoDen + HiDen

3.2 Variables
- acc_hwy: accesibility to highway, calculated by distance to specific highway entries ("Limited" zonal variables from MAPC)
- acc_pop: AM driving accessibility to 2727 zonal population, calculated by gravity model with friction factor
- acc_emp: AM driving accessibility to 2727 zonal employment, calculated by gravity model with friction factor
- ind_den_1, ind_den_2, ind_den_6, ind_den_11: density of jobs in industry sector 1, 2, 6, 11
- log(mid_inc+1): log transform of (zonal median income/1000), log(mid_inc+1)=ln(mid_inc/1000+1)
- SF_C: dummy for sites 10,000-39,999 square feet (MAPC)
- WareH: dummy for warehouse, industrial, utilities land use type (MAPC)
- far: real estate far (MAPC)
- LoDen: Real estate product variable from MAPC, dummy variable indicating whether the parcel is of the low density retail, entertainment, services, medical, office, hospitality land use type
- HiDen: Real estate product variable from MAPC, dummy variable indicating whether the parcel is of the high density retail, entertainment, services, medical, office, hospitality land use type

3.3 Variables that have been tried but are not significant in the bidding function
- Acc_HH: accessibility to total household, correlated with acc_pop

3.4 Group definition

Table 5 Group Definitions for the Firms

Agent ID	Obs.	Agent Description
(Ref) 1	184	Construction
2	397	Health and Education
3	382	Finance
4	89	Government
5	133	Information
6	1064	Retail & Leisure
7	296	Manufacture
8	5	Nat Res and Extraction
9	218	Other Services
10	512	Professional Serv.
11	260	Utility/Transp/Wholesale

3.5 Result

(file: share_LU model/Estimation/Non-Residential/20160501_rejoin2_MAPCdata/Firms_2010_CL_simplify~1)

Model:	Multinomial Logit
Number of estimated parameters:	140
Number of observations:	7486
Number of individuals:	7486
Null log-likelihood:	-17950.644
Cte log-likelihood:	-15863.480
Init log-likelihood:	-6352134.043
Final log-likelihood:	-13543.191
Likelihood ratio test:	8814.906
Rho-square:	0.246
Adjusted rho-square:	0.238
Final gradient norm:	+8.829e-04
Diagnostic:	Normal termination. Obj: 6.05545e-06 Const: 6.05545e-06
Iterations:	239
Run time:	23:39
Variance-covariance:	from analytical hessian
Sample file:	Firms_2010_BG_160501.dat

Table 6 Model Estimation Results for Firm Location Choice Model

Name	Value	Rob. p-val	
ASC_1	0		
ASC_10	-1.58	0.06	*
ASC_11	-0.249	0.77	*
ASC_2	0.364	0.62	*
ASC_3	-1.19	0.17	*
ASC_4	0.261	0.76	*
ASC_5	-0.617	0.51	*
ASC_6	0.695	0.33	*
ASC_7	-1.72	0.06	*
ASC_8	-2.15	0.6	*
ASC_9	0.487	0.57	*
HiDen1	0		
HiDen10	1.04	0	
HiDen11	-0.664	0.13	*
HiDen2	0.0175	0.96	*
HiDen3	0.753	0.02	
HiDen4	0.282	0.52	*
HiDen5	1.81	0	
HiDen6	0.506	0.11	*
HiDen7	-0.283	0.49	*
HiDen8	-24.9	1	*
HiDen9	0.438	0.22	*
LoDen1	0		
LoDen10	0.504	0.04	
LoDen11	-0.0282	0.92	*
LoDen2	0.143	0.55	*
LoDen3	0.0593	0.81	*
LoDen4	-0.452	0.18	*
LoDen5	1.11	0	
LoDen6	0.362	0.1	*
LoDen7	-0.0249	0.93	*
LoDen8	0.416	0.67	*
LoDen9	-0.121	0.65	*
SFC_is_C1	0		
SFC_is_C10	0.539	0.02	
SFC_is_C11	2.91	0	
SFC_is_C2	1.69	0	
SFC_is_C3	0.599	0.01	
SFC_is_C4	2.6	0	
SFC_is_C5	3.08	0	
SFC_is_C6	0.547	0.01	

SFC_is_C7	2.97	0	
SFC_is_C8	3.18	0	
SFC_is_C9	0.729	0.01	
WareH1	0		
WareH10	-0.846	0	
WareH11	-0.203	0.46	*
WareH2	-2.49	0	
WareH3	-2.03	0	
WareH4	-2.53	0	
WareH5	-1.14	0.02	
WareH6	-2.07	0	
WareH7	0.0776	0.77	*
WareH8	-19.2	0	
WareH9	-1.57	0	
acc_emp1	0		
acc_emp10	0.000819	0.04	
acc_emp11	0.000587	0.18	*
acc_emp2	0.000665	0.11	*
acc_emp3	4.62E-05	0.91	*
acc_emp4	0.000534	0.27	*
acc_emp5	0.000989	0.03	
acc_emp6	0.00043	0.27	*
acc_emp7	0.001	0.02	
acc_emp8	0.000757	0.55	*
acc_emp9	-0.000221	0.64	*
acc_hwy1	0		
acc_hwy10	-1.68	0.14	*
acc_hwy11	0.932	0.37	*
acc_hwy2	0.31	0.76	*
acc_hwy3	-3.77	0	
acc_hwy4	0.734	0.67	*
acc_hwy5	-0.227	0.89	*
acc_hwy6	0.688	0.44	*
acc_hwy7	0.956	0.34	*
acc_hwy8	3.83	0.36	*
acc_hwy9	0.127	0.91	*
acc_pop1	0		
acc_pop10	-0.00085	0.36	*
acc_pop11	-0.000932	0.37	*
acc_pop2	0.0028	0	
acc_pop3	0.00154	0.1	*
acc_pop4	0.00154	0.22	*
acc_pop5	-0.00073	0.59	*

acc_pop6	0.00129	0.12	*
acc_pop7	-0.000304	0.77	*
acc_pop8	-0.00251	0.59	*
acc_pop9	0.00131	0.18	*
far1	0		
far10	0.372	0.26	*
far11	0.15	0.74	*
far2	0.23	0.49	*
far3	0.213	0.55	*
far4	-0.127	0.83	*
far5	0.199	0.64	*
far6	0.222	0.48	*
far7	0.729	0.03	
far8	-1.09	0.69	*
far9	-0.12	0.78	*
gsize1	1		
gsize10	1		
gsize11	1		
gsize2	1		
gsize3	1		
gsize4	1		
gsize5	1		
gsize6	1		
gsize7	1		
gsize8	1		
gsize9	1		
ind_den1_1	0		
ind_den1_10	-0.00317	0.39	*
ind_den1_11	-0.0126	0.1	*
ind_den1_2	-0.00838	0.06	*
ind_den1_3	-0.00193	0.62	*
ind_den1_4	-0.0073	0.2	*
ind_den1_5	-0.0043	0.41	*
ind_den1_6	-0.0107	0.01	
ind_den1_7	-0.00578	0.31	*
ind_den1_8	-0.111	0.34	*
ind_den1_9	-0.00475	0.29	*
ind_den2_1	0		
ind_den2_10	0.00545	0.17	*
ind_den2_11	0.00155	0.77	*
ind_den2_2	0.00956	0.01	
ind_den2_3	0.00566	0.16	*
ind_den2_4	0.00814	0.04	

ind_den2_5	0.00639	0.11	*
ind_den2_6	0.007	0.07	*
ind_den2_7	0.00386	0.4	*
ind_den2_8	0.00489	0.39	*
ind_den2_9	0.00758	0.05	*
ind_den6_1	0		
ind_den6_10	0.0083	0.02	
ind_den6_11	0.00663	0.09	*
ind_den6_2	0.00534	0.16	*
ind_den6_3	0.00832	0.02	
ind_den6_4	0.00841	0.02	
ind_den6_5	0.00546	0.15	*
ind_den6_6	0.00957	0.01	
ind_den6_7	0.00485	0.21	*
ind_den6_8	0.0117	0.06	*
ind_den6_9	0.00774	0.03	
log_mid_inc1	0		
log_mid_inc10	0.204	0.26	*
log_mid_inc11	-0.298	0.11	*
log_mid_inc2	-0.382	0.02	
log_mid_inc3	0.253	0.18	*
log_mid_inc4	-0.4	0.04	
log_mid_inc5	-0.465	0.02	
log_mid_inc6	-0.352	0.02	
log_mid_inc7	-0.0793	0.69	*
log_mid_inc8	0.135	0.86	*
log_mid_inc9	-0.175	0.35	*