MNL11.1 – Combinação de Variáveis socioeconómicas, TC e Viagem

- ASC

- Lc - Var. binária de disponibilidade de Licença de condução (Lc)
- NCia - Var. binária nº auto disponíveis diariamente no agregado per capita (expto NC4a).

- TBA – Variável continua com a razão dos tempos médios de viagem em BUS e AUTO entre zona de Geração e Atracção

- Fm – Variável continua inicial sobre a frequência média horária de TC na hora de ponta da manhã (7h30-9h30)

- V2 – Variável continua para velocidade comercial equivalente de BUS em km/h

- d2 -Var. continua para distância + curta entre centróides (excepto pedonais 3,6km/h)
- dx1 - Var.bin distância + curta entre centróides (expto ped.3,6km/h) <=1,0km
- dx2 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >1,0km e <= 2,0km
- dx3 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >2,0km e <=5,0km
- *dx4a - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >5,0km (excluída)*

```
DISCRETECHOICE
;Lhs=MTRP
;Choices=Bp,B,Bo,M,P,A[1]
;Rh2=ONE,NC0,NC1,NC2,NC3,LC,FM,V2,TBA,D2,DX1,DX2,DX3$
+---------------------------------------------+
| Discrete choice and multinomial logit models|
+---------------------------------------------+
Normal exit from iterations. Exit status=0.
+---------------------------------------------+
| Discrete choice (multinomial logit) model   |
| Maximum Likelihood Estimates                |
| Model estimated: Jan 13, 2012 at 08:01:01AM.|
| Dependent variable               Choice     |
| Weighting variable                 None     |
| Number of observations            40099     |
| Iterations completed                 32     |
| Log likelihood function       -29264.99     |
| Number of parameters                 65     |
| Info. Criterion: AIC =          1.46288     |
|   Finite Sample: AIC =          1.46288     |
| Info. Criterion: BIC =          1.47682     |
| Info. Criterion:HQIC =          1.46729     |
| R2=1-LogL/LogL*  Log-L fncn  R-sqrd  RsqAdj |
| Constants only  -50751.5442  .42337  .42318 |
| Chi-squared[60]          =  42973.11341     |
| Prob [ chi squared > value ] =   .00000     |
| Response data are given as ind. choice.     |
| Number of obs.= 95426, skipped**** bad obs. |
+---------------------------------------------+

+---------------------------------------------+
| Notes No coefficients=> P(i,j)=1/J(i).      |
```

```
|       Constants only => P(i,j) uses ASCs    |
|         only. N(j)/N if fixed choice set.   |
|         N(j) = total sample frequency for j |
|         N    = total sample frequency.      |
|       These 2 models are simple MNL models. |
|       R-sqrd = 1 - LogL(model)/logL(other)  |
|       RsqAdj=1-[nJ/(nJ-nparm)]*(1-R-sqrd)   |
|         nJ   = sum over i, choice set sizes |
+---------------------------------------------+
```

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]
A_BP	-3.48855611	1.03746681	-3.363	.0008
BP_NC01	5.31997056	1.00300534	5.304	.0000
BP_NC11	3.30873975	1.00487318	3.293	.0010
BP_NC21	2.66453840	1.00457103	2.652	.0080
BP_NC31	1.67894997	1.03235396	1.626	.1039
BP_LC1	-2.09712851	.08247962	-25.426	.0000
BP_FM1	.00362594	.00511990	.708	.4788
BP_V21	-.13327721	.01184186	-11.255	.0000
BP_TBA1	-1.36672067	.10468144	-13.056	.0000
BP_D21	.26380562	.01594403	16.546	.0000
BP_DX11	-1.22304196	1.02085105	-1.198	.2309
BP_DX21	.07842181	.16514682	.475	.6349
BP_DX31	.28256532	.10552702	2.678	.0074
A_B	.68566580	.19313474	3.550	.0004
B_NC02	3.73828908	.14621599	25.567	.0000
B_NC12	1.82215848	.14684584	12.409	.0000
B_NC22	1.38994902	.14546561	9.555	.0000
B_NC32	.65292720	.15769022	4.141	.0000
B_LC2	-1.91699005	.03288579	-58.292	.0000
B_FM2	.02791998	.00232578	12.005	.0000
B_V22	-.12620065	.00527768	-23.912	.0000
B_TBA2	-1.10196173	.04593669	-23.989	.0000
B_D22	.13329637	.01017219	13.104	.0000
B_DX12	-1.18285721	.25634184	-4.614	.0000
B_DX22	-.86985226	.08242157	-10.554	.0000
B_DX32	-.36170279	.05109690	-7.079	.0000
A_BO	-5.20156470	.38440254	-13.532	.0000
BO_NC03	1.98650520	.25776097	7.707	.0000
BO_NC13	.92143531	.25871918	3.562	.0004
BO_NC23	.20373009	.25762015	.791	.4291
BO_NC33	-.09891135	.29441525	-.336	.7369
BO_LC3	-1.46727438	.08201492	-17.890	.0000
BO_FM3	-.08715556	.01006525	-8.659	.0000
BO_V23	.00949252	.01106934	.858	.3911
BO_TBA3	.46459404	.09245713	5.025	.0000
BO_D23	.18296834	.01580671	11.575	.0000
BO_DX13	-28.5665980	.216562D+07	.000	1.0000
BO_DX23	1.16972103	.18951246	6.172	.0000
BO_DX33	.89308391	.11042434	8.088	.0000
A_M	-4.94851027	.39940991	-12.390	.0000
M_NC04	3.33279770	.30903872	10.784	.0000
M_NC14	1.45417534	.31337181	4.640	.0000
M_NC24	.94793537	.31115714	3.046	.0023
M_NC34	.82792434	.33107936	2.501	.0124

M_LC4	-1.30608681	.06783879	-19.253	.0000
M_FM4	-.05980874	.00712498	-8.394	.0000
M_V24	.03840500	.00841573	4.563	.0000
M_TBA4	.33463017	.07851366	4.262	.0000
M_D24	.00383437	.02280499	.168	.8665
M_DX14	-29.2725765	.182221D+07	.000	1.0000
M_DX24	.98665939	.16605867	5.942	.0000
M_DX34	.58112654	.10709507	5.426	.0000
A_P	5.53479893	.45423478	12.185	.0000
P_NC05	2.92359992	.16828590	17.373	.0000
P_NC15	1.04987646	.17116438	6.134	.0000
P_NC25	.64383617	.16775130	3.838	.0001
P_NC35	-.00121004	.20391056	-.006	.9953
P_LC5	-1.74805034	.05657355	-30.899	.0000
P_FM5	.01692291	.00332325	5.092	.0000
P_V25	-.20115882	.01710811	-11.758	.0000
P_TBA5	-.17270882	.06636983	-2.602	.0093
P_D25	-1.40265296	.08313911	-16.871	.0000
P_DX15	-.13666429	.39511534	-.346	.7294
P_DX25	-2.16109681	.32285130	-6.694	.0000
P_DX35	-2.94572532	.26064744	-11.302	.0000

MNL11.2 – Combinação de Variáveis socioeconómicas, TC e Viagem

- ASC

- Lc - Var. binária de disponibilidade de Licença de condução (Lc)
- NCia - Var. binária nº auto disponíveis diariamente no agregado per capita (expto NC4a).

- TBA – Variável continua com a razão dos tempos médios de viagem em BUS e AUTO entre zona de Geração e Atracção

- Fm – Variável continua inicial sobre a frequência média horária de TC na hora de ponta da manhã (7h30-9h30)

- V2 – Variável continua para velocidade comercial equivalente de BUS em km/h

- d2 -Var. continua para distância + curta entre centróides (excepto pedonais 3,6km/h)
- dx1 - Var.bin distância + curta entre centróides (expto ped.3,6km/h) <=1,0km
- dx2 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >1,0km e <= 2,0km
- dx3 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >2,0km e <=5,0km
- *dx4a - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >5,0km (excluída)*

- Tia – Variável continua genérica duração média apreendida da viagem por modo (min) entre GA com a duração apreendida real qd é o modo escolhido

- *Tr2: Variável binária para viagens para o trabalho (com motivo da viagem anterior nas viagens para casa) (excluída)*
- Es2: Variável binária para viagens para a Escola (com motivo da viagem anterior nas viagens para casa)
- Lz2: Variável binária para viagens para Lazer (com motivo da viagem anterior nas viagens para casa)
- CS2: Variável binária para viagens para Compras/Serviços (com motivo da viagem anterior nas viagens para casa)

```
DISCRETECHOICE
;Lhs=MTRP
;Choices=Bp,B,Bo,M,P,A[1]
;Attr=Tia;Rhs=T1A,T2A,T3A,T4A,T5A,T6A
;Rh2=ONE,NC0,NC1,NC2,NC3,LC,D2,DX1,DX2,DX3,FM,V2,TBA,ES2,LZ2,CS2$
+---------------------------------------------+
| Discrete choice and multinomial logit models|
+---------------------------------------------+
Normal exit from iterations. Exit status=0.
+---------------------------------------------+
| Discrete choice (multinomial logit) model   |
| Maximum Likelihood Estimates                |
| Model estimated: Jan 13, 2012 at 09:03:13AM.|
| Dependent variable               Choice     |
| Weighting variable                 None     |
| Number of observations             9275     |
| Iterations completed                 32     |
| Log likelihood function       -6726.466     |
```

```
| Number of parameters                81     |
| Info. Criterion: AIC =          1.46792     |
|   Finite Sample: AIC =          1.46807     |
| Info. Criterion: BIC =          1.53023     |
| Info. Criterion:HQIC =          1.48909     |
| R2=1-LogL/LogL*  Log-L fncn  R-sqrd  RsqAdj |
| Constants only  -11731.9006  .42665  .42565 |
| Chi-squared[76]          =  10010.86919     |
| Prob [ chi squared > value ] =   .00000     |
| Response data are given as ind. choice.     |
| Number of obs.= 95426, skipped**** bad obs. |
+---------------------------------------------+

+---------------------------------------------+
| Notes No coefficients=> P(i,j)=1/J(i).      |
|       Constants only => P(i,j) uses ASCs    |
|         only. N(j)/N if fixed choice set.   |
|         N(j) = total sample frequency for j |
|         N    = total sample frequency.      |
|       These 2 models are simple MNL models. |
|       R-sqrd = 1 - LogL(model)/logL(other)  |
|       RsqAdj=1-[nJ/(nJ-nparm)]*(1-R-sqrd)   |
|         nJ   = sum over i, choice set sizes |
+---------------------------------------------+
```

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]
TIA	.01817878	.00243548	7.464	.0000
A_BP	-28.4477755	524704.496	.000	1.0000
BP_NC01	30.5647103	524704.496	.000	1.0000
BP_NC11	28.9848984	524704.496	.000	1.0000
BP_NC21	28.2272836	524704.496	.000	1.0000
BP_NC31	27.0724490	524704.496	.000	1.0000
BP_LC1	-2.70413258	.21610453	-12.513	.0000
BP_D21	-.12824415	.08830083	-1.452	.1464
BP_DX11	-1.31828352	.108114D+08	.000	1.0000
BP_DX21	-.45171969	.41697375	-1.083	.2787
BP_DX31	-.55569217	.27029870	-2.056	.0398
BP_FM1	-.02099537	.02435443	-.862	.3886
BP_V21	-.07323178	.02818382	-2.598	.0094
BP_TBA1	-.58554642	.24701542	-2.370	.0178
BP_ES21	-.15769369	.19591791	-.805	.4209
BP_LZ21	-.99620977	.20023185	-4.975	.0000
BP_CS21	-.37641538	.20735600	-1.815	.0695
A_B	1.49028756	.52868618	2.819	.0048
B_NC02	3.57463211	.42870094	8.338	.0000
B_NC12	1.87019070	.42833296	4.366	.0000
B_NC22	1.36993806	.42700300	3.208	.0013
B_NC32	.53269490	.44731781	1.191	.2337
B_LC2	-2.20453469	.08306097	-26.541	.0000
B_D22	.15701751	.03003626	5.228	.0000
B_DX12	-.99892420	.480033D+07	.000	1.0000
B_DX22	-2.61488442	.26444742	-9.888	.0000
B_DX32	-.41291552	.11538366	-3.579	.0003
B_FM2	-.02050727	.01144363	-1.792	.0731
B_V22	-.13705041	.01241558	-11.039	.0000

B_TBA2	-1.37371392	.11980558	-11.466	.0000
B_ES22	.44162277	.09716531	4.545	.0000
B_LZ22	-.83916983	.09612776	-8.730	.0000
B_CS22	-.34464319	.10613202	-3.247	.0012
A_BO	-4.31470296	.91196931	-4.731	.0000
BO_NC03	3.09675561	.72726600	4.258	.0000
BO_NC13	2.04805254	.72487434	2.825	.0047
BO_NC23	1.16627505	.72537077	1.608	.1079
BO_NC33	.30470861	.78380516	.389	.6975
BO_LC3	-1.53360269	.16120483	-9.513	.0000
BO_D23	.23002075	.05822177	3.951	.0001
BO_DX13	1.34811252	.869512D+07	.000	1.0000
BO_DX23	1.26115206	.36540816	3.451	.0006
BO_DX33	.49004323	.23151977	2.117	.0343
BO_FM3	-.13850328	.02824710	-4.903	.0000
BO_V23	-.04039124	.02128019	-1.898	.0577
BO_TBA3	.09339421	.18696915	.500	.6174
BO_ES23	.42466262	.16143247	2.631	.0085
BO_LZ23	-2.39161979	.29915446	-7.995	.0000
BO_CS23	-1.98264340	.33584056	-5.904	.0000
A_M	-4.51448319	.86543649	-5.216	.0000
M_NC04	3.78610099	.72003521	5.258	.0000
M_NC14	2.09234847	.72288577	2.894	.0038
M_NC24	1.62819896	.72039370	2.260	.0238
M_NC34	1.26227761	.74446333	1.696	.0900
M_LC4	-2.01004727	.11860653	-16.947	.0000
M_D24	.15282965	.05175869	2.953	.0031
M_DX14	2.17100396	.718362D+07	.000	1.0000
M_DX24	1.72999842	.32509525	5.322	.0000
M_DX34	1.38159106	.21026157	6.571	.0000
M_FM4	-.08327002	.01848049	-4.506	.0000
M_V24	.01917764	.01859943	1.031	.3025
M_TBA4	-.00912318	.15199490	-.060	.9521
M_ES24	-2.69231630	.25852929	-10.414	.0000
M_LZ24	-1.34590487	.13613476	-9.887	.0000
M_CS24	-1.48148418	.17876019	-8.288	.0000
A_P	17.4324261	1.72925230	10.081	.0000
P_NC05	3.16513151	.68253059	4.637	.0000
P_NC15	.98183932	.68522644	1.433	.1519
P_NC25	.80909481	.67877195	1.192	.2333
P_NC35	-.50053852	.80914905	-.619	.5362
P_LC5	-1.70742160	.18548284	-9.205	.0000
P_D25	-4.63344600	.35012566	-13.234	.0000
P_DX15	20.5337292	.277986D+07	.000	1.0000
P_DX25	-11.4230587	1.13474708	-10.067	.0000
P_DX35	-9.43942915	.92222513	-10.235	.0000
P_FM5	-.08788606	.02908470	-3.022	.0025
P_V25	-.10577840	.05381956	-1.965	.0494
P_TBA5	1.42165011	.32578540	4.364	.0000
P_ES25	.18475859	.21128593	.874	.3819
P_LZ25	.11804505	.21218320	.556	.5780
P_CS25	.16264583	.25254130	.644	.5196

MNL11.3 – Combinação de Variáveis socioeconómicas, TC e Viagem

- ASC

- Lc - Var. binária de disponibilidade de Licença de condução (Lc)
- NCia - Var. binária nº auto disponíveis diariamente no agregado per capita (expto NC4a).

- TBA – Variável continua com a razão dos tempos médios de viagem em BUS e AUTO entre zona de Geração e Atracção

- Ftl – Variável continua inicial sobre a frequência média horária de TC durante o período laboral (7h30-19h30)

- V2 – Variável continua para velocidade comercial equivalente de BUS em km/h

- d2 -Var. continua para distância + curta entre centróides (excepto pedonais 3,6km/h)
- dx1 - Var.bin distância + curta entre centróides (expto ped.3,6km/h) <=1,0km
- dx2 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >1,0km e <= 2,0km
- dx3 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >2,0km e <=5,0km
- dx4 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >5,0km (excluída)

- Tia – Variável continua genérica duração média apreendida da viagem por modo (min) entre GA com a duração apreendida real qd é o modo escolhido

- *Tr: Variável binária para viagens para o (excluída)*
- Es: Variável binária para viagens para a Escola
- Lz: Variável binária para viagens para
- CS: Variável binária para viagens para Compras/

```
DISCRETECHOICE
;Lhs=MTRP
;Choices=Bp,B,Bo,M,P,A[1]
;Attr=Tia;Rhs=T1A,T2A,T3A,T4A,T5A,T6A
;Rh2=ONE,NC0,NC1,NC2,NC3,LC,D2,DX1,DX2,DX3,FTL,V2,TBA,ES,LZ,CS$
+---------------------------------------------+
| Discrete choice and multinomial logit models|
+---------------------------------------------+
Normal exit from iterations. Exit status=0.
+---------------------------------------------+
| Discrete choice (multinomial logit) model   |
| Maximum Likelihood Estimates                |
| Model estimated: Jan 13, 2012 at 08:20:46AM.|
| Dependent variable               Choice     |
| Weighting variable                 None     |
| Number of observations            10264     |
| Iterations completed                 32     |
| Log likelihood function       -7504.630     |
| Number of parameters                 81     |
| Info. Criterion: AIC =          1.47810     |
|   Finite Sample: AIC =          1.47823     |
| Info. Criterion: BIC =          1.53521     |
```

```
| Info. Criterion:HQIC =          1.49741     |
| R2=1-LogL/LogL*  Log-L fncn  R-sqrd  RsqAdj |
| Constants only  -12738.8690  .41089  .40996 |
| Chi-squared[76]          =  10468.47794     |
| Prob [ chi squared > value ] =   .00000     |
| Response data are given as ind. choice.     |
| Number of obs.= 95426, skipped**** bad obs. |
+---------------------------------------------+

+---------------------------------------------+
| Notes No coefficients=> P(i,j)=1/J(i).      |
|       Constants only => P(i,j) uses ASCs    |
|         only. N(j)/N if fixed choice set.   |
|         N(j) = total sample frequency for j |
|         N    = total sample frequency.      |
|       These 2 models are simple MNL models. |
|       R-sqrd = 1 - LogL(model)/logL(other)  |
|       RsqAdj=1-[nJ/(nJ-nparm)]*(1-R-sqrd)   |
|         nJ   = sum over i, choice set sizes |
+---------------------------------------------+
```

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]
TIA	.01836854	.00232799	7.890	.0000
A_BP	-28.6656581	405567.518	.000	.9999
BP_NC01	29.9770915	405567.518	.000	.9999
BP_NC11	28.3947130	405567.518	.000	.9999
BP_NC21	27.6669602	405567.518	.000	.9999
BP_NC31	26.6760698	405567.518	.000	.9999
BP_LC1	-2.71641279	.20731340	-13.103	.0000
BP_D21	-.13979211	.08320736	-1.680	.0929
BP_DX11	-1.18614024	.109385D+08	.000	1.0000
BP_DX21	-.60197175	.39910132	-1.508	.1315
BP_DX31	-.54862154	.24972549	-2.197	.0280
BP_FTL1	.00087010	.02120301	.041	.9673
BP_V21	-.04907431	.02561944	-1.916	.0554
BP_TBA1	-.44775231	.23287923	-1.923	.0545
BP_ES1	.05356526	.21053218	.254	.7992
BP_LZ1	-.66824668	.22980868	-2.908	.0036
BP_CS1	-.22133109	.26103781	-.848	.3965
A_B	1.22932869	.51709103	2.377	.0174
B_NC02	3.47526081	.42509313	8.175	.0000
B_NC12	1.83977259	.42527772	4.326	.0000
B_NC22	1.36686466	.42394512	3.224	.0013
B_NC32	.64494076	.44167306	1.460	.1442
B_LC2	-2.22870419	.07351627	-30.316	.0000
B_D22	.15078416	.02821291	5.345	.0000
B_DX12	-.91936935	.504288D+07	.000	1.0000
B_DX22	-2.56007796	.24743784	-10.346	.0000
B_DX32	-.36634994	.10664453	-3.435	.0006
B_FTL2	-.02126779	.01007114	-2.112	.0347
B_V22	-.13045648	.01166126	-11.187	.0000
B_TBA2	-1.33272510	.11288013	-11.807	.0000
B_ES2	.48432853	.09929040	4.878	.0000
B_LZ2	-.61132287	.10629823	-5.751	.0000
B_CS2	-.19689339	.12917581	-1.524	.1275

A_BO	-4.78770046	.90342959	-5.299	.0000
BO_NC03	2.86753783	.72428089	3.959	.0001
BO_NC13	2.00424364	.72274685	2.773	.0056
BO_NC23	1.15052026	.72293992	1.591	.1115
BO_NC33	.28268446	.78144965	.362	.7175
BO_LC3	-1.48513801	.14130413	-10.510	.0000
BO_D23	.21521944	.05485563	3.923	.0001
BO_DX13	1.28112110	.102830D+08	.000	1.0000
BO_DX23	1.32382035	.35389557	3.741	.0002
BO_DX33	.53019005	.22066145	2.403	.0163
BO_FTL3	-.12201956	.02352663	-5.186	.0000
BO_V23	-.02746070	.02022819	-1.358	.1746
BO_TBA3	.11630199	.18099729	.643	.5205
BO_ES3	.70415441	.16250824	4.333	.0000
BO_LZ3	-1.55210516	.32975475	-4.707	.0000
BO_CS3	-1.22384668	.39263737	-3.117	.0018
A_M	-4.57692421	.85276296	-5.367	.0000
M_NC04	3.77740368	.71736307	5.266	.0000
M_NC14	2.01807011	.72081915	2.800	.0051
M_NC24	1.51303652	.71857908	2.106	.0352
M_NC34	1.20176609	.74129567	1.621	.1050
M_LC4	-1.63310044	.10841367	-15.064	.0000
M_D24	.15198509	.04957713	3.066	.0022
M_DX14	1.48257928	.847509D+07	.000	1.0000
M_DX24	1.37492302	.31101481	4.421	.0000
M_DX34	1.15765758	.19868627	5.827	.0000
M_FTL4	-.05195293	.01580055	-3.288	.0010
M_V24	-.01128798	.01786058	-.632	.5274
M_TBA4	-.14981880	.14944342	-1.003	.3161
M_ES4	-2.23831022	.38973979	-5.743	.0000
M_LZ4	-.58900286	.16317709	-3.610	.0003
M_CS4	-.86490959	.23626169	-3.661	.0003
A_P	17.0591516	1.63969107	10.404	.0000
P_NC05	2.89813519	.67381727	4.301	.0000
P_NC15	.90380646	.67684749	1.335	.1818
P_NC25	.79745260	.67094282	1.189	.2346
P_NC35	-.59968642	.79573592	-.754	.4511
P_LC5	-1.85945718	.16978381	-10.952	.0000
P_D25	-4.59639711	.32214350	-14.268	.0000
P_DX15	21.2304209	.291306D+07	.000	1.0000
P_DX25	-11.1444566	1.07069795	-10.409	.0000
P_DX35	-9.19000604	.87513844	-10.501	.0000
P_FTL5	-.08013406	.02504918	-3.199	.0014
P_V25	-.06767052	.05043383	-1.342	.1797
P_TBA5	1.42181664	.30521432	4.658	.0000
P_ES5	-.27200571	.22088055	-1.231	.2182
P_LZ5	.03662660	.22673796	.162	.8717
P_CS5	-.10026115	.31329381	-.320	.7490

MNL11.3a – Combinação de Variáveis socioeconómicas, TC e Viagem

- ASC

- Lc - Var. binária de disponibilidade de Licença de condução (Lc)
- NCia - Var. binária nº auto disponíveis diariamente no agregado per capita (expto NC4a).

- TBA – Variável continua com a razão dos tempos médios de viagem em BUS e AUTO entre zona de Geração e Atracção

- Ftl – Variável continua inicial sobre a frequência média horária de TC durante o período laboral (7h30-19h30)

- V2 – Variável continua para velocidade comercial equivalente de BUS em km/h

- d2 -Var. continua para distância + curta entre centróides (excepto pedonais 3,6km/h)
- dx1 - Var.bin distância + curta entre centróides (expto ped.3,6km/h) <=1,0km
- dx2 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >1,0km e <= 2,0km
- dx3 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >2,0km e <=5,0km
- dx4 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >5,0km (excluída)

- Tia – Variável continua genérica duração média apreendida da viagem por modo (min) entre GA com a duração apreendida real qd é o modo escolhido

- *Tr2: Variável binária para viagens para o trabalho (com motivo da viagem anterior nas viagens para casa) (excluída)*
- Es2: Variável binária para viagens para a Escola (com motivo da viagem anterior nas viagens para casa)
- Lz2: Variável binária para viagens para Lazer (com motivo da viagem anterior nas viagens para casa)
- CS2: Variável binária para viagens para Compras/Serviços (com motivo da viagem anterior nas viagens para casa)

```
DISCRETECHOICE
;Lhs=MTRP
;Choices=Bp,B,Bo,M,P,A[1]
;Attr=Tia;Rhs=T1A,T2A,T3A,T4A,T5A,T6A
;Rh2=ONE,NC0,NC1,NC2,NC3,LC,D2,DX1,DX2,DX3,FTL,V2,TBA,ES2,LZ2,CS2$

+---------------------------------------------+
| Discrete choice and multinomial logit models|
+---------------------------------------------+
Hessian is not definite at current values.
Switching to BFGS (gradient based) method.
(Not a failure. Just looking for a better algorithm.)
Note: DFP and BFGS usually take more than 4 or 5
iterations to converge.  If this problem was not
structured for quick convergence, you might want
to examine results closely. If convergence is too
early, tighten convergence with, e.g., ;TLG=1.D-9.
Normal exit from iterations. Exit status=0.
```

```
+---------------------------------------------+
| Discrete choice (multinomial logit) model   |
| Maximum Likelihood Estimates                |
| Model estimated: Jan 13, 2012 at 09:10:43AM.|
| Dependent variable               Choice     |
| Weighting variable                 None     |
| Number of observations             9275     |
| Iterations completed                  1     |
| Log likelihood function       -6729.412     |
| Number of parameters                 81     |
| Info. Criterion: AIC =          1.46855     |
|   Finite Sample: AIC =          1.46871     |
| Info. Criterion: BIC =          1.53086     |
| Info. Criterion:HQIC =          1.48972     |
| R2=1-LogL/LogL*  Log-L fncn  R-sqrd  RsqAdj |
| Constants only  -11731.9006  .42640  .42540 |
| Chi-squared[76]          =  10004.97723     |
| Prob [ chi squared > value ] =   .00000     |
| Response data are given as ind. choice.     |
| Number of obs.= 95426, skipped**** bad obs. |
+---------------------------------------------+

+---------------------------------------------+
| Notes No coefficients=> P(i,j)=1/J(i).      |
|       Constants only => P(i,j) uses ASCs    |
|         only. N(j)/N if fixed choice set.   |
|         N(j) = total sample frequency for j |
|         N    = total sample frequency.      |
|       These 2 models are simple MNL models. |
|       R-sqrd = 1 - LogL(model)/logL(other)  |
|       RsqAdj=1-[nJ/(nJ-nparm)]*(1-R-sqrd)   |
|         nJ   = sum over i, choice set sizes |
+---------------------------------------------+
+--------+--------------+----------------+--------+--------+
|Variable| Coefficient  | Standard Error |b/St.Er.|P[|Z|>z]|
+--------+--------------+----------------+--------+--------+
 ATTRIB01|     .01848847      1.00000000      .018   .9852
 A_BP    |   -30.2232269    .......(Fixed Parameter).......
 BP_NC01 |    32.2878014    .......(Fixed Parameter).......
 BP_NC11 |    30.7071617    .......(Fixed Parameter).......
 BP_NC21 |    29.9448499    .......(Fixed Parameter).......
 BP_NC31 |    28.7926768    .......(Fixed Parameter).......
 BP_LC1  |   -2.69521129    .......(Fixed Parameter).......
 BP_ES21 |    -.15255589    .......(Fixed Parameter).......
 BP_LZ21 |   -1.00135045    .......(Fixed Parameter).......
 BP_CS21 |    -.38168402    .......(Fixed Parameter).......
 BP_D21  |    -.14005263    .......(Fixed Parameter).......
 BP_DX11 |   -1.34487677      1.00000000    -1.345   .1787
 BP_DX21 |    -.53110760    .......(Fixed Parameter).......
 BP_DX31 |    -.61435789    .......(Fixed Parameter).......
 BP_V21  |    -.07242624    .......(Fixed Parameter).......
 BP_TBA1 |    -.54761453    .......(Fixed Parameter).......
 BP_FTL1 |    -.00093327    .......(Fixed Parameter).......
 A_B     |    1.53726493    .......(Fixed Parameter).......
 B_NC02  |    3.56845741    .......(Fixed Parameter).......
 B_NC12  |    1.86445668    .......(Fixed Parameter).......
```

B_NC22	1.36623900	.....(Fixed Parameter).....			
B_NC32	.52708317	.....(Fixed Parameter).....			
B_LC2	-2.20641983	.....(Fixed Parameter).....			
B_ES22	.43830832	.....(Fixed Parameter).....			
B_LZ22	-.83849768	.....(Fixed Parameter).....			
B_CS22	-.34680188	.....(Fixed Parameter).....			
B_D22	.15927699	.....(Fixed Parameter).....			
B_DX12	-.92494882	.....(Fixed Parameter).....			
B_DX22	-2.57540550	.....(Fixed Parameter).....			
B_DX32	-.41985514	.....(Fixed Parameter).....			
B_V22	-.13719552	.....(Fixed Parameter).....			
B_TBA2	-1.39081209	.....(Fixed Parameter).....			
B_FTL2	-.02273933	.....(Fixed Parameter).....			
A_BO	-4.18281001	.....(Fixed Parameter).....			
BO_NC03	3.07207564	.....(Fixed Parameter).....			
BO_NC13	2.03022045	.....(Fixed Parameter).....			
BO_NC23	1.15248460	.....(Fixed Parameter).....			
BO_NC33	.28458242	.....(Fixed Parameter).....			
BO_LC3	-1.53564246	.....(Fixed Parameter).....			
BO_ES23	.42305008	.....(Fixed Parameter).....			
BO_LZ23	-2.39440871	.....(Fixed Parameter).....			
BO_CS23	-1.98858428	.....(Fixed Parameter).....			
BO_D23	.23430695	.....(Fixed Parameter).....			
BO_DX13	1.29719322	.....(Fixed Parameter).....			
BO_DX23	1.28291807	4.62949200	.277	.7817	
BO_DX33	.40954577	94.2090560	.004	.9965	
BO_V23	-.04289513	.....(Fixed Parameter).....			
BO_TBA3	.06916683	.....(Fixed Parameter).....			
BO_FTL3	-.11603098	.....(Fixed Parameter).....			
A_M	-4.47097204	.....(Fixed Parameter).....			
M_NC04	3.76483301	.....(Fixed Parameter).....			
M_NC14	2.07490081	.....(Fixed Parameter).....			
M_NC24	1.60498443	.....(Fixed Parameter).....			
M_NC34	1.24422733	4.85648186	.256	.7978	
M_LC4	-2.00633708	1.69701547	-1.182	.2371	
M_ES24	-2.68860735	6.64876143	-.404	.6859	
M_LZ24	-1.34805291	.....(Fixed Parameter).....			
M_CS24	-1.48565619	.....(Fixed Parameter).....			
M_D24	.15185370	.....(Fixed Parameter).....			
M_DX14	2.12728497	.....(Fixed Parameter).....			
M_DX24	1.73164589	.....(Fixed Parameter).....			
M_DX34	1.31393914	.....(Fixed Parameter).....			
M_V24	.01843684	.....(Fixed Parameter).....			
M_TBA4	-.00611748	.....(Fixed Parameter).....			
M_FTL4	-.06040624	.....(Fixed Parameter).....			
A_P	17.4477363	41.6317068	.419	.6751	
P_NC05	3.16719335	.....(Fixed Parameter).....			
P_NC15	.97722392	.....(Fixed Parameter).....			
P_NC25	.80104414	15.4885157	.052	.9588	
P_NC35	-.51995408	.....(Fixed Parameter).....			
P_LC5	-1.71792522	.....(Fixed Parameter).....			
P_ES25	.16151532	.....(Fixed Parameter).....			
P_LZ25	.11859468	.....(Fixed Parameter).....			
P_CS25	.17482196	.....(Fixed Parameter).....			
P_D25	-4.64487247	.....(Fixed Parameter).....			
P_DX15	18.7218936	.....(Fixed Parameter).....			

```
P_DX25  |   -11.2787030    ......(Fixed Parameter).......
P_DX35  |   -9.42577621    ......(Fixed Parameter).......
P_V25   |    -.08961681    ......(Fixed Parameter).......
P_TBA5  |    1.36065659    ......(Fixed Parameter).......
P_FTL5  |    -.09203581    ......(Fixed Parameter).......
```

MNL11.4 – Combinação de Variáveis socioeconómicas, TC e Viagem

- ASC

- Idi - Var. binária escalão etário (expto Id1)
- Ini - Var. binária nível de instrução (expto In4)
- Sexo - Var. binária Sexo
- Ri - Var. binária escalões do rend. Liquí. mensal do agreg (expto R5)
- Lc - Var. binária de disponibilidade de Licença de condução (Lc)
- NCia - Var. binária nº auto disponíveis diariamente no agregado per capita (expto NC4a).

- TBA – Variável continua com a razão dos tempos médios de viagem em BUS e AUTO entre zona de Geração e Atracção

- Fm – Variável continua inicial sobre a frequência média horária de TC na hora de ponta da manhã (7h30-9h30)

- V2 – Variável continua para velocidade comercial equivalente de BUS em km/h

- d2 -Var. continua para distância + curta entre centróides (excepto pedonais 3,6km/h)
- dx1 - Var.bin distância + curta entre centróides (expto ped.3,6km/h) <=1,0km
- dx2 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >1,0km e <= 2,0km
- dx3 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >2,0km e <=5,0km
- dx4 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >5,0km (excluída)

- Tia – Variável continua genérica duração média apreendida da viagem por modo (min) entre GA com a duração apreendida real qd é o modo escolhido

- *Tr2: Variável binária para viagens para o trabalho (com motivo da viagem anterior nas viagens para casa) (excluída)*
- Es2: Variável binária para viagens para a Escola (com motivo da viagem anterior nas viagens para casa)
- Lz2: Variável binária para viagens para Lazer (com motivo da viagem anterior nas viagens para casa)
- CS2: Variável binária para viagens para Compras/Serviços (com motivo da viagem anterior nas viagens para casa)

```
DISCRETECHOICE
;Lhs=MTRP
;Choices=Bp,B,Bo,M,P,A[1]
;Attr=Tia;Rhs=T1A,T2A,T3A,T4A,T5A,T6A
;Rh2=ONE,NC0,NC1,NC2,NC3,R1,R2,R3,R4,SX,ID2,ID3,ID4,ID5,IN1,IN2,IN3,D2,DX1,DX2,DX3,
FM,V2,TBA,ES2,LZ2,CS2$
+--------------------------------------------+
| Discrete choice and multinomial logit models|
+--------------------------------------------+
Hessian is not definite at current values.
Switching to BFGS (gradient based) method.
(Not a failure. Just looking for a better algorithm.)
Note: DFP and BFGS usually take more than 4 or 5
iterations to converge.  If this problem was not
```

```
structured for quick convergence, you might want
to examine results closely. If convergence is too
early, tighten convergence with, e.g., ;TLG=1.D-9.
Normal exit from iterations. Exit status=0.
+---------------------------------------------+
| Discrete choice (multinomial logit) model   |
| Maximum Likelihood Estimates                |
| Model estimated: Jan 13, 2012 at 09:26:41AM.|
| Dependent variable               Choice     |
| Weighting variable                 None     |
| Number of observations             9275     |
| Iterations completed                  1     |
| Log likelihood function       -6374.372     |
| Number of parameters                141     |
| Info. Criterion: AIC =          1.40493     |
|   Finite Sample: AIC =          1.40540     |
| Info. Criterion: BIC =          1.51340     |
| Info. Criterion:HQIC =          1.44179     |
| R2=1-LogL/LogL*  Log-L fncn  R-sqrd  RsqAdj |
| Constants only  -11731.9006  .45666  .45501 |
| Chi-squared[**]          =  10715.05742     |
| Prob [ chi squared > value ] =   .00000     |
| Response data are given as ind. choice.     |
| Number of obs.= 95426, skipped**** bad obs. |
+---------------------------------------------+

+---------------------------------------------+
| Notes No coefficients=> P(i,j)=1/J(i).      |
|       Constants only => P(i,j) uses ASCs    |
|         only. N(j)/N if fixed choice set.   |
|         N(j) = total sample frequency for j |
|         N    = total sample frequency.      |
|       These 2 models are simple MNL models. |
|       R-sqrd = 1 - LogL(model)/logL(other)  |
|       RsqAdj=1-[nJ/(nJ-nparm)]*(1-R-sqrd)   |
|         nJ   = sum over i, choice set sizes |
+---------------------------------------------+
+--------+-------------+----------------+--------+--------+
|Variable| Coefficient  | Standard Error |b/St.Er.|P[|Z|>z]|
+--------+-------------+----------------+--------+--------+
 ATTRIB01|     .01893202      1.00000000      .019   .9849
 A_BP    |   -34.0538580    .....(Fixed Parameter).......
 BP_NC01 |    31.8688761    .....(Fixed Parameter).......
 BP_NC11 |    30.4015539    .....(Fixed Parameter).......
 BP_NC21 |    29.7417640    .....(Fixed Parameter).......
 BP_NC31 |    28.7881374    .....(Fixed Parameter).......
 BP_R11  |     .52766648    .....(Fixed Parameter).......
 BP_R21  |     .56019078    .....(Fixed Parameter).......
 BP_R31  |     .39222331    .....(Fixed Parameter).......
 BP_R41  |    -.83335622    .....(Fixed Parameter).......
 BP_SX1  |     .88669611    .....(Fixed Parameter).......
 BP_ID21 |    2.67145673    .....(Fixed Parameter).......
 BP_ID31 |    2.84652075    .....(Fixed Parameter).......
 BP_ID41 |    2.95825694    .....(Fixed Parameter).......
 BP_ID51 |    2.39596443    .....(Fixed Parameter).......
 BP_IN11 |     .78328061    .....(Fixed Parameter).......
 BP_IN21 |     .14461860    .....(Fixed Parameter).......
```

BP_IN31	-.06332449	1.00000000	-.063	.9495
BP_LC1	-2.52765628	.....(Fixed Parameter).....		
BP_ES21	.53310153	.....(Fixed Parameter).....		
BP_LZ21	-.59853205	.....(Fixed Parameter).....		
BP_CS21	-.26909914	.....(Fixed Parameter).....		
BP_D21	-.08882614	.....(Fixed Parameter).....		
BP_DX11	-.88962207	.....(Fixed Parameter).....		
BP_DX21	-.30742626	.....(Fixed Parameter).....		
BP_DX31	-.36089946	.....(Fixed Parameter).....		
BP_FM1	-.01485177	.....(Fixed Parameter).....		
BP_V21	-.07672868	.....(Fixed Parameter).....		
BP_TBA1	-.68151139	.....(Fixed Parameter).....		
A_B	-.93282054	.....(Fixed Parameter).....		
B_NC02	3.63042928	.....(Fixed Parameter).....		
B_NC12	2.06207303	.....(Fixed Parameter).....		
B_NC22	1.61711777	.....(Fixed Parameter).....		
B_NC32	.76401417	.....(Fixed Parameter).....		
B_R12	.73001334	.....(Fixed Parameter).....		
B_R22	.27625294	.....(Fixed Parameter).....		
B_R32	.35407960	.....(Fixed Parameter).....		
B_R42	.33436546	.....(Fixed Parameter).....		
B_SX2	.54145270	.....(Fixed Parameter).....		
B_ID22	1.89748990	.....(Fixed Parameter).....		
B_ID32	1.98129025	.....(Fixed Parameter).....		
B_ID42	1.94370240	.....(Fixed Parameter).....		
B_ID52	1.99864724	.....(Fixed Parameter).....		
B_IN12	-.23610795	.....(Fixed Parameter).....		
B_IN22	-.28071628	.....(Fixed Parameter).....		
B_IN32	-.09488501	.....(Fixed Parameter).....		
B_LC2	-2.23074437	.....(Fixed Parameter).....		
B_ES22	.78442831	.....(Fixed Parameter).....		
B_LZ22	-.64521918	.....(Fixed Parameter).....		
B_CS22	-.34417549	.....(Fixed Parameter).....		
B_D22	.16543836	.....(Fixed Parameter).....		
B_DX12	-.95431723	.....(Fixed Parameter).....		
B_DX22	-2.68248307	.....(Fixed Parameter).....		
B_DX32	-.36752723	.....(Fixed Parameter).....		
B_FM2	-.00777391	.....(Fixed Parameter).....		
B_V22	-.13912569	.....(Fixed Parameter).....		
B_TBA2	-1.46158943	.....(Fixed Parameter).....		
A_BO	-5.33382517	.....(Fixed Parameter).....		
BO_NC03	2.70436201	.....(Fixed Parameter).....		
BO_NC13	1.95567937	.....(Fixed Parameter).....		
BO_NC23	1.12514107	.....(Fixed Parameter).....		
BO_NC33	.41010038	.....(Fixed Parameter).....		
BO_R13	.75128507	.....(Fixed Parameter).....		
BO_R23	.08234689	.....(Fixed Parameter).....		
BO_R33	-.24642985	.....(Fixed Parameter).....		
BO_R43	-.25291659	.....(Fixed Parameter).....		
BO_SX3	-.47643976	.....(Fixed Parameter).....		
BO_ID23	.98134234	.....(Fixed Parameter).....		
BO_ID33	.92545872	.....(Fixed Parameter).....		
BO_ID43	.82806056	.....(Fixed Parameter).....		
BO_ID53	-.55917006	.....(Fixed Parameter).....		
BO_IN13	.50148966	.....(Fixed Parameter).....		
BO_IN23	.47731668	.....(Fixed Parameter).....		
BO_IN33	-.87741355	.....(Fixed Parameter).....		

BO_LC3	-1.54613071	5.07713804	-.305	.7607
BO_ES23	.45081965	31.5262049	.014	.9886
BO_LZ23	-2.25284435	26.6054712	-.085	.9325
BO_CS23	-1.69208996	19.3961515	-.087	.9305
BO_D23	.24109495	.....(Fixed Parameter).....		
BO_DX13	1.59380768	7.08656122	.225	.8221
BO_DX23	1.27190988	.....(Fixed Parameter).....		
BO_DX33	.57571190	.....(Fixed Parameter).....		
BO_FM3	-.13129887	.....(Fixed Parameter).....		
BO_V23	-.03707892	.....(Fixed Parameter).....		
BO_TBA3	.08797968	.....(Fixed Parameter).....		
A_M	-8.38792732	14.5732932	-.576	.5649
M_NC04	3.38289552	.....(Fixed Parameter).....		
M_NC14	1.75717409	.....(Fixed Parameter).....		
M_NC24	1.51803550	.....(Fixed Parameter).....		
M_NC34	1.12841407	.....(Fixed Parameter).....		
M_R14	.11362401	3.62128080	.031	.9750
M_R24	.22588388	.....(Fixed Parameter).....		
M_R34	.22073149	.56307753	.392	.6951
M_R44	.14241296	1.03233137	.138	.8903
M_SX4	-1.10845534	5.13037805	-.216	.8289
M_ID24	3.53001611	.....(Fixed Parameter).....		
M_ID34	3.75962120	.....(Fixed Parameter).....		
M_ID44	3.01920932	.....(Fixed Parameter).....		
M_ID54	2.17269689	5.23742672	.415	.6783
M_IN14	2.24126337	.....(Fixed Parameter).....		
M_IN24	1.10635139	.....(Fixed Parameter).....		
M_IN34	.10873052	.....(Fixed Parameter).....		
M_LC4	-2.30822588	.....(Fixed Parameter).....		
M_ES24	-2.79434933	.....(Fixed Parameter).....		
M_LZ24	-1.11557109	.....(Fixed Parameter).....		
M_CS24	-.89491960	.....(Fixed Parameter).....		
M_D24	.12155216	.....(Fixed Parameter).....		
M_DX14	2.43510683	.....(Fixed Parameter).....		
M_DX24	1.78502731	.....(Fixed Parameter).....		
M_DX34	1.46587239	2.03127115	.722	.4705
M_FM4	-.08881630	.....(Fixed Parameter).....		
M_V24	.03750751	.....(Fixed Parameter).....		
M_TBA4	.03417588	.....(Fixed Parameter).....		
A_P	16.2019782	.....(Fixed Parameter).....		
P_NC05	3.32750364	.....(Fixed Parameter).....		
P_NC15	1.15356499	.....(Fixed Parameter).....		
P_NC25	.92848213	.....(Fixed Parameter).....		
P_NC35	-.48726223	.....(Fixed Parameter).....		
P_R15	-.29216427	60.6546657	-.005	.9962
P_R25	-.44302694	.....(Fixed Parameter).....		
P_R35	-.32984117	.....(Fixed Parameter).....		
P_R45	.06576038	.....(Fixed Parameter).....		
P_SX5	.21495887	.....(Fixed Parameter).....		
P_ID25	.37051606	.....(Fixed Parameter).....		
P_ID35	.79832900	.....(Fixed Parameter).....		
P_ID45	.91098780	.....(Fixed Parameter).....		
P_ID55	1.35032601	.....(Fixed Parameter).....		
P_IN15	-.61128355	.....(Fixed Parameter).....		
P_IN25	.31894598	.....(Fixed Parameter).....		
P_IN35	.31150594	.....(Fixed Parameter).....		
P_LC5	-1.94632641	.....(Fixed Parameter).....		

```
P_ES25  |     .70216445    ......(Fixed Parameter).......
P_LZ25  |     .37594918    ......(Fixed Parameter).......
P_CS25  |     .08830543    ......(Fixed Parameter).......
P_D25   |   -4.57313140    ......(Fixed Parameter).......
P_DX15  |    19.8842550    ......(Fixed Parameter).......
P_DX25  |   -11.2234340    ......(Fixed Parameter).......
P_DX35  |   -9.24686322    ......(Fixed Parameter).......
P_FM5   |    -.08366569    ......(Fixed Parameter).......
P_V25   |    -.11153489     .282426D-06  ********   .0000
P_TBA5  |    1.35326763      4.89246753      .277   .7821
```

MNL11.4a – Combinação de Variáveis socioeconómicas, TC e Viagem

- ASC

- Idi - Var. binária escalão etário (expto Id1)
- Ini - Var. binária nível de instrução (expto In4)
- Sexo - Var. binária Sexo
- Ri - Var. binária escalões do rend. Liquí. mensal do agreg (expto R5)
- Lc - Var. binária de disponibilidade de Licença de condução (Lc)
- NCia - Var. binária nº auto disponíveis diariamente no agregado per capita (expto NC4a).

- TBA – Variável continua com a razão dos tempos médios de viagem em BUS e AUTO entre zona de Geração e Atracção

- Fm – Variável continua inicial sobre a frequência média horária de TC na hora de ponta da manhã (7h30-9h30)

- V2 – Variável continua para velocidade comercial equivalente de BUS em km/h

- d2 -Var. continua para distância + curta entre centróides (excepto pedonais 3,6km/h)
- dx1 - Var.bin distância + curta entre centróides (expto ped.3,6km/h) <=1,0km
- dx2 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >1,0km e <= 2,0km
- dx3 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >2,0km e <=5,0km
- dx4 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >5,0km (excluída)

- Tia – Variável continua genérica duração média apreendida da viagem por modo (min) entre GA com a duração apreendida real qd é o modo escolhido

Tr - Trab viagens com motivo ir para o trabalho (excluída)
Es - Escola viagens com motivo ir para a escola
La - Lazer viagens com motivo lazer
CS - Cp_Sv viagens com motivo ir para às compras ou a serviços

```
DISCRETECHOICE
;Lhs=MTRP
;Choices=Bp,B,Bo,M,P,A[1]
;Attr=Tia;Rhs=T1A,T2A,T3A,T4A,T5A,T6A
;Rh2=ONE,NC0,NC1,NC2,NC3,R1,R2,R3,R4,SX,ID2,ID3,ID4,ID5,IN1,IN2,IN3,D2,DX1,DX2,DX3,
FM,V2,TBA,ES,LZ,CS$
```

```
+---------------------------------------------+
| Discrete choice and multinomial logit models|
+---------------------------------------------+
Normal exit from iterations. Exit status=0.
+---------------------------------------------+
| Discrete choice (multinomial logit) model   |
| Maximum Likelihood Estimates                |
| Model estimated: Jan 13, 2012 at 09:37:41AM.|
| Dependent variable              Choice      |
| Weighting variable                None      |
```

```
| Number of observations             10264     |
| Iterations completed                  32     |
| Log likelihood function         -7074.553    |
| Number of parameters                 141     |
| Info. Criterion: AIC =            1.40599    |
|   Finite Sample: AIC =            1.40638    |
| Info. Criterion: BIC =            1.50540    |
| Info. Criterion:HQIC =            1.43960    |
| R2=1-LogL/LogL*  Log-L fncn  R-sqrd  RsqAdj  |
| Constants only  -12738.8690  .44465  .44312  |
| Chi-squared[**]           =  11328.63248     |
| Prob [ chi squared > value ] =   .00000      |
| Response data are given as ind. choice.      |
| Number of obs.= 95426, skipped**** bad obs.  |
+----------------------------------------------+

+----------------------------------------------+
| Notes No coefficients=> P(i,j)=1/J(i).       |
|       Constants only => P(i,j) uses ASCs     |
|         only. N(j)/N if fixed choice set.    |
|         N(j) = total sample frequency for j  |
|         N    = total sample frequency.       |
|       These 2 models are simple MNL models.  |
|       R-sqrd = 1 - LogL(model)/logL(other)   |
|       RsqAdj=1-[nJ/(nJ-nparm)]*(1-R-sqrd)    |
|         nJ   = sum over i, choice set sizes  |
+----------------------------------------------+
```

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]
ATTRIB01	.01875814	.00236544	7.930	.0000
A_BP	-32.8234686	510514.425	.000	.9999
BP_NC01	30.4700807	510514.425	.000	1.0000
BP_NC11	28.9842838	510514.425	.000	1.0000
BP_NC21	28.3558546	510514.425	.000	1.0000
BP_NC31	27.5043746	510514.425	.000	1.0000
BP_R11	.19619360	.33925768	.578	.5631
BP_R21	.36487384	.28126654	1.297	.1945
BP_R31	.11970857	.29480227	.406	.6847
BP_R41	-.72615667	.45878560	-1.583	.1135
BP_SX1	.79604509	.15609345	5.100	.0000
BP_ID21	2.52798983	.52975373	4.772	.0000
BP_ID31	2.57840610	.54274456	4.751	.0000
BP_ID41	2.67550068	.52558952	5.090	.0000
BP_ID51	2.19040896	.54558810	4.015	.0001
BP_IN11	.52081630	.69230662	.752	.4519
BP_IN21	.26092380	.60927405	.428	.6685
BP_IN31	.00031449	.64176592	.000	.9996
BP_LC1	-2.70291529	.22503918	-12.011	.0000
BP_ES1	.38870617	.24230135	1.604	.1087
BP_LZ1	-.48089731	.23589254	-2.039	.0415
BP_CS1	-.27323054	.26713023	-1.023	.3064
BP_D21	-.10788161	.08117606	-1.329	.1839
BP_DX11	-.73124420	.102491D+08	.000	1.0000
BP_DX21	-.37638092	.39573744	-.951	.3416
BP_DX31	-.32287609	.25420910	-1.270	.2040
BP_V21	-.04496195	.02602101	-1.728	.0840

BP_TBA1	-.52001054	.23917972	-2.174	.0297
BP_FM1	-.01219672	.02346611	-.520	.6032
A_B	-.82857280	.59156406	-1.401	.1613
B_NC02	3.54691338	.43783492	8.101	.0000
B_NC12	1.94347400	.43604744	4.457	.0000
B_NC22	1.55244417	.43336341	3.582	.0003
B_NC32	.81179991	.45044655	1.802	.0715
B_R12	.54342626	.15967382	3.403	.0007
B_R22	.31547689	.11741558	2.687	.0072
B_R32	.35382910	.11958602	2.959	.0031
B_R42	.39128982	.14321573	2.732	.0063
B_SX2	.48937162	.07024090	6.967	.0000
B_ID22	1.86850185	.19898558	9.390	.0000
B_ID32	1.64996753	.20769465	7.944	.0000
B_ID42	1.55662988	.20063952	7.758	.0000
B_ID52	1.54169425	.22181372	6.950	.0000
B_IN12	-.43365101	.26066408	-1.664	.0962
B_IN22	-.18454919	.18497586	-.998	.3184
B_IN32	.01225640	.19426482	.063	.9497
B_LC2	-2.28096989	.08806032	-25.902	.0000
B_ES2	.48870106	.11431830	4.275	.0000
B_LZ2	-.51306541	.11136860	-4.607	.0000
B_CS2	-.21277152	.13300815	-1.600	.1097
B_D22	.15442666	.02890522	5.343	.0000
B_DX12	-.93459063	.506835D+07	.000	1.0000
B_DX22	-2.66572019	.25256131	-10.555	.0000
B_DX32	-.32089619	.11437903	-2.806	.0050
B_V22	-.13161374	.01220283	-10.786	.0000
B_TBA2	-1.40899729	.11795316	-11.945	.0000
B_FM2	-.00600884	.01125335	-.534	.5934
A_BO	-5.70628985	1.05533833	-5.407	.0000
BO_NC03	2.61334365	.73607631	3.550	.0004
BO_NC13	1.81061192	.73172557	2.474	.0133
BO_NC23	1.05603933	.72875126	1.449	.1473
BO_NC33	.27879106	.78669508	.354	.7231
BO_R13	.42467548	.27913416	1.521	.1282
BO_R23	.08014461	.20923508	.383	.7017
BO_R33	-.20358762	.22375552	-.910	.3629
BO_R43	-.18238615	.27853546	-.655	.5126
BO_SX3	-.59970292	.13340467	-4.495	.0000
BO_ID23	1.08339582	.32196790	3.365	.0008
BO_ID33	.85361483	.35870971	2.380	.0173
BO_ID43	.63116662	.34270534	1.842	.0655
BO_ID53	-1.31235166	.66092389	-1.986	.0471
BO_IN13	.09762519	.59964929	.163	.8707
BO_IN23	.64283749	.47120480	1.364	.1725
BO_IN33	-.76583506	.54625116	-1.402	.1609
BO_LC3	-1.50337746	.17741925	-8.474	.0000
BO_ES3	.50095748	.18473452	2.712	.0067
BO_LZ3	-1.44691998	.33290305	-4.346	.0000
BO_CS3	-.91065483	.39610869	-2.299	.0215
BO_D23	.22062989	.05543454	3.980	.0001
BO_DX13	1.65660390	.933940D+07	.000	1.0000
BO_DX23	1.28607469	.35460868	3.627	.0003
BO_DX33	.67094163	.22515342	2.980	.0029
BO_V23	-.02382862	.02080395	-1.145	.2520
BO_TBA3	.11186719	.18330933	.610	.5417

BO_FM3	-.13840551	.02791184	-4.959	.0000
A_M	-8.92149267	1.07638269	-8.288	.0000
M_NC04	3.46943481	.72575677	4.780	.0000
M_NC14	1.74879031	.72702757	2.405	.0162
M_NC24	1.42049912	.72269536	1.966	.0493
M_NC34	1.13633253	.74625313	1.523	.1278
M_R14	-.18325843	.25806871	-.710	.4776
M_R24	.24962136	.19837070	1.258	.2083
M_R34	.31585785	.20423180	1.547	.1220
M_R44	.23348858	.24461363	.955	.3398
M_SX4	-1.11379003	.11611973	-9.592	.0000
M_ID24	3.13766459	.51908224	6.045	.0000
M_ID34	4.34794951	.51542031	8.436	.0000
M_ID44	3.56006612	.51030487	6.976	.0000
M_ID54	2.45211777	.53823795	4.556	.0000
M_IN14	1.90719958	.51138735	3.729	.0002
M_IN24	1.24865449	.43362569	2.880	.0040
M_IN34	.24979928	.47152240	.530	.5963
M_LC4	-2.29172340	.13134719	-17.448	.0000
M_ES4	-1.86054566	.40333302	-4.613	.0000
M_LZ4	-.38162683	.17179038	-2.221	.0263
M_CS4	-.44592814	.24398734	-1.828	.0676
M_D24	.10912207	.05224556	2.089	.0367
M_DX14	2.19029700	.693536D+07	.000	1.0000
M_DX24	1.54313089	.31899607	4.837	.0000
M_DX34	1.31616187	.20945892	6.284	.0000
M_V24	.01808476	.01830462	.988	.3232
M_TBA4	-.04330083	.15326576	-.283	.7775
M_FM4	-.08522496	.01902974	-4.479	.0000
A_P	15.9903517	1.72124006	9.290	.0000
P_NC05	3.03598241	.68529580	4.430	.0000
P_NC15	1.07050840	.68726430	1.558	.1193
P_NC25	.91837888	.67723735	1.356	.1751
P_NC35	-.60797687	.80733020	-.753	.4514
P_R15	-.34635433	.32637270	-1.061	.2886
P_R25	-.41298125	.25644226	-1.610	.1073
P_R35	-.35154473	.26502458	-1.326	.1847
P_R45	-.01753203	.30362120	-.058	.9540
P_SX5	.15002596	.15467648	.970	.3321
P_ID25	.52353509	.42025938	1.246	.2129
P_ID35	.67161794	.44583675	1.506	.1320
P_ID45	.73133989	.42893755	1.705	.0882
P_ID55	1.18743933	.45155076	2.630	.0085
P_IN15	-.27555059	.60478214	-.456	.6487
P_IN25	.28641611	.45112085	.635	.5255
P_IN35	.40438695	.47535712	.851	.3949
P_LC5	-2.08819934	.20385064	-10.244	.0000
P_ES5	-.08383377	.24097813	-.348	.7279
P_LZ5	.10318991	.23040497	.448	.6543
P_CS5	-.26313891	.33210088	-.792	.4282
P_D25	-4.56426195	.32774141	-13.926	.0000
P_DX15	21.3145871	.292771D+07	.000	1.0000
P_DX25	-11.1334556	1.07216385	-10.384	.0000
P_DX35	-9.05511528	.87492823	-10.350	.0000
P_V25	-.07888053	.05115238	-1.542	.1231
P_TBA5	1.53437109	.31382884	4.889	.0000
P_FM5	-.07237257	.02737865	-2.643	.0082

MNL11.5 – Combinação de Variáveis socioeconómicas, TC e Viagem

- ASC

- Idi - Var. binária escalão etário (expto Id1)
- Ini - Var. binária nível de instrução (expto In4)
- Sexo - Var. binária Sexo
- Ri - Var. binária escalões do rend. Liquí. mensal do agreg (expto R5)
- Lc - Var. binária de disponibilidade de Licença de condução (Lc)
- NCia - Var. binária nº auto disponíveis diariamente no agregado per capita (expto NC4a).

- TBA – Variável continua com a razão dos tempos médios de viagem em BUS e AUTO entre zona de Geração e Atracção

- Ftl – Variável continua inicial sobre a frequência média horária de TC durante o período laboral (7h30-19h30)

- V2 – Variável continua para velocidade comercial equivalente de BUS em km/h

- d2 -Var. continua para distância + curta entre centróides (excepto pedonais 3,6km/h)
- dx1 - Var.bin distância + curta entre centróides (expto ped.3,6km/h) <=1,0km
- dx2 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >1,0km e <= 2,0km
- dx3 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >2,0km e <=5,0km
- dx4 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >5,0km (excluída)

- Tia – Variável continua genérica duração média apreendida da viagem por modo (min) entre GA com a duração apreendida real qd é o modo escolhido

- *Tr2: Variável binária para viagens para o trabalho (com motivo da viagem anterior nas viagens para casa) (excluída)*
- Es2: Variável binária para viagens para a Escola (com motivo da viagem anterior nas viagens para casa)
- Lz2: Variável binária para viagens para Lazer (com motivo da viagem anterior nas viagens para casa)
- CS2: Variável binária para viagens para Compras/Serviços (com motivo da viagem anterior nas viagens para casa)

```
DISCRETECHOICE
;Lhs=MTRP
;Choices=Bp,B,Bo,M,P,A[1]
;Attr=Tia;Rhs=T1A,T2A,T3A,T4A,T5A,T6A
;Rh2=ONE,NC0,NC1,NC2,NC3,R1,R2,R3,R4,SX,ID2,ID3,ID4,ID5,IN1,IN2,IN3,D2,DX1,DX2,DX3,
FTL,V2,TBA,ES2,LZ2,CS2$
+--------------------------------------------+
| Discrete choice and multinomial logit models|
+--------------------------------------------+
Hessian is not definite at current values.
Switching to BFGS (gradient based) method.
(Not a failure. Just looking for a better algorithm.)
Note: DFP and BFGS usually take more than 4 or 5
iterations to converge.  If this problem was not
```

```
structured for quick convergence, you might want
to examine results closely. If convergence is too
early, tighten convergence with, e.g., ;TLG=1.D-9.
Normal exit from iterations. Exit status=0.
+---------------------------------------------+
| Discrete choice (multinomial logit) model   |
| Maximum Likelihood Estimates                |
| Model estimated: Jan 13, 2012 at 10:26:16AM.|
| Dependent variable               Choice     |
| Weighting variable                 None     |
| Number of observations             9275     |
| Iterations completed                  1     |
| Log likelihood function       -6378.182     |
| Number of parameters                141     |
| Info. Criterion: AIC =          1.40575     |
|   Finite Sample: AIC =          1.40623     |
| Info. Criterion: BIC =          1.51422     |
| Info. Criterion:HQIC =          1.44261     |
| R2=1-LogL/LogL*  Log-L fncn  R-sqrd  RsqAdj |
| Constants only  -11731.9006  .45634  .45468 |
| Chi-squared[**]          =  10707.43778     |
| Prob [ chi squared > value ] =   .00000     |
| Response data are given as ind. choice.     |
| Number of obs.= 95426, skipped**** bad obs. |
+---------------------------------------------+

+---------------------------------------------+
| Notes No coefficients=> P(i,j)=1/J(i).      |
|       Constants only => P(i,j) uses ASCs    |
|         only. N(j)/N if fixed choice set.   |
|         N(j) = total sample frequency for j |
|         N    = total sample frequency.      |
|       These 2 models are simple MNL models. |
|       R-sqrd = 1 - LogL(model)/logL(other)  |
|       RsqAdj=1-[nJ/(nJ-nparm)]*(1-R-sqrd)   |
|         nJ   = sum over i, choice set sizes |
+---------------------------------------------+
+--------+-------------+----------------+--------+--------+
|Variable| Coefficient  | Standard Error |b/St.Er.|P[|Z|>z]|
+--------+-------------+----------------+--------+--------+
 ATTRIB01|     .01927615      1.00000000      .019   .9846
 A_BP    |   -44.5265504    .....(Fixed Parameter).......
 BP_NC01 |    42.2916416    .....(Fixed Parameter).......
 BP_NC11 |    40.8255230    .....(Fixed Parameter).......
 BP_NC21 |    40.1611259    .....(Fixed Parameter).......
 BP_NC31 |    39.2122620    .....(Fixed Parameter).......
 BP_R11  |     .53021812    .....(Fixed Parameter).......
 BP_R21  |     .55229247    .....(Fixed Parameter).......
 BP_R31  |     .38543201    .....(Fixed Parameter).......
 BP_R41  |    -.84080895    .....(Fixed Parameter).......
 BP_SX1  |     .88785041    .....(Fixed Parameter).......
 BP_ID21 |    2.67440303    .....(Fixed Parameter).......
 BP_ID31 |    2.84782026    .....(Fixed Parameter).......
 BP_ID41 |    2.95783488    .....(Fixed Parameter).......
 BP_ID51 |    2.39547991    .....(Fixed Parameter).......
 BP_IN11 |     .77103066    .....(Fixed Parameter).......
 BP_IN21 |     .14223693    .....(Fixed Parameter).......
```

BP_IN31	-.06618334	1.00000000	-.066 .9472
BP_LC1	-2.51845027	.....(Fixed Parameter).....	
BP_ES21	.53672686	.....(Fixed Parameter).....	
BP_LZ21	-.60503108	.....(Fixed Parameter).....	
BP_CS21	-.27548017	.....(Fixed Parameter).....	
BP_D21	-.10075212	.....(Fixed Parameter).....	
BP_DX11	-.96231114	.....(Fixed Parameter).....	
BP_DX21	-.38822725	.....(Fixed Parameter).....	
BP_DX31	-.41435549	.....(Fixed Parameter).....	
BP_V21	-.07589213	.....(Fixed Parameter).....	
BP_TBA1	-.64491376	.....(Fixed Parameter).....	
BP_FTL1	.00471657	.....(Fixed Parameter).....	
A_B	-.89861902	.....(Fixed Parameter).....	
B_NC02	3.62255971	.....(Fixed Parameter).....	
B_NC12	2.05443013	.....(Fixed Parameter).....	
B_NC22	1.61330049	.....(Fixed Parameter).....	
B_NC32	.76024228	.....(Fixed Parameter).....	
B_R12	.73318393	.....(Fixed Parameter).....	
B_R22	.28137218	.....(Fixed Parameter).....	
B_R32	.35837788	.....(Fixed Parameter).....	
B_R42	.33915726	.....(Fixed Parameter).....	
B_SX2	.53803275	.....(Fixed Parameter).....	
B_ID22	1.89603065	.....(Fixed Parameter).....	
B_ID32	1.98418050	.....(Fixed Parameter).....	
B_ID42	1.94392472	.....(Fixed Parameter).....	
B_ID52	1.99876596	.....(Fixed Parameter).....	
B_IN12	-.23325713	.....(Fixed Parameter).....	
B_IN22	-.28071577	.....(Fixed Parameter).....	
B_IN32	-.09724065	.....(Fixed Parameter).....	
B_LC2	-2.23464818	.....(Fixed Parameter).....	
B_ES22	.78245307	.....(Fixed Parameter).....	
B_LZ22	-.64286950	.....(Fixed Parameter).....	
B_CS22	-.34433877	.....(Fixed Parameter).....	
B_D22	.16735213	.....(Fixed Parameter).....	
B_DX12	-.91421752	.....(Fixed Parameter).....	
B_DX22	-2.63993427	.....(Fixed Parameter).....	
B_DX32	-.36041948	.....(Fixed Parameter).....	
B_V22	-.13871460	.....(Fixed Parameter).....	
B_TBA2	-1.47846740	.....(Fixed Parameter).....	
B_FTL2	-.01286456	.....(Fixed Parameter).....	
A_BO	-5.16037199	.....(Fixed Parameter).....	
BO_NC03	2.68667505	.....(Fixed Parameter).....	
BO_NC13	1.94536324	.....(Fixed Parameter).....	
BO_NC23	1.12114324	.....(Fixed Parameter).....	
BO_NC33	.39785679	.....(Fixed Parameter).....	
BO_R13	.75108298	.....(Fixed Parameter).....	
BO_R23	.06910701	.....(Fixed Parameter).....	
BO_R33	-.25418430	.....(Fixed Parameter).....	
BO_R43	-.26265995	.....(Fixed Parameter).....	
BO_SX3	-.47989843	.....(Fixed Parameter).....	
BO_ID23	.97916390	.....(Fixed Parameter).....	
BO_ID33	.91560690	.....(Fixed Parameter).....	
BO_ID43	.82938364	.....(Fixed Parameter).....	
BO_ID53	-.54914884	.....(Fixed Parameter).....	
BO_IN13	.48128068	.....(Fixed Parameter).....	
BO_IN23	.45111572	.....(Fixed Parameter).....	
BO_IN33	-.90467567	.....(Fixed Parameter).....	

BO_LC3	-1.55093009	5.06968301	-.306	.7597
BO_ES23	.44730275	31.5777600	.014	.9887
BO_LZ23	-2.26438886	47.8620736	-.047	.9623
BO_CS23	-1.70468528	19.4099079	-.088	.9300
BO_D23	.24494327	.....(Fixed Parameter).....		
BO_DX13	1.49418323	7.09260268	.211	.8331
BO_DX23	1.29448847	.....(Fixed Parameter).....		
BO_DX33	.49558083	.....(Fixed Parameter).....		
BO_V23	-.03960578	.....(Fixed Parameter).....		
BO_TBA3	.06228938	.....(Fixed Parameter).....		
BO_FTL3	-.11176561	.....(Fixed Parameter).....		
A_M	-8.30080222	21.0248669	-.395	.6930
M_NC04	3.36369303	.....(Fixed Parameter).....		
M_NC14	1.74337575	.....(Fixed Parameter).....		
M_NC24	1.49804201	.....(Fixed Parameter).....		
M_NC34	1.12160013	.....(Fixed Parameter).....		
M_R14	.11421428	3.62889479	.031	.9749
M_R24	.21006295	.....(Fixed Parameter).....		
M_R34	.21082068	.55752493	.378	.7053
M_R44	.12567930	1.04771005	.120	.9045
M_SX4	-1.10718360	5.14002066	-.215	.8295
M_ID24	3.52997468	.....(Fixed Parameter).....		
M_ID34	3.74539331	.....(Fixed Parameter).....		
M_ID44	3.01656425	.....(Fixed Parameter).....		
M_ID54	2.17629219	11.3449816	.192	.8479
M_IN14	2.22186382	.....(Fixed Parameter).....		
M_IN24	1.08002900	.....(Fixed Parameter).....		
M_IN34	.08714945	.....(Fixed Parameter).....		
M_LC4	-2.30078299	.....(Fixed Parameter).....		
M_ES24	-2.79500146	.....(Fixed Parameter).....		
M_LZ24	-1.12948800	.....(Fixed Parameter).....		
M_CS24	-.91101899	.....(Fixed Parameter).....		
M_D24	.11953189	.....(Fixed Parameter).....		
M_DX14	2.34517955	.....(Fixed Parameter).....		
M_DX24	1.78116262	.....(Fixed Parameter).....		
M_DX34	1.38821479	2.02923719	.684	.4939
M_V24	.03662993	.....(Fixed Parameter).....		
M_TBA4	.03960441	.....(Fixed Parameter).....		
M_FTL4	-.06303748	.....(Fixed Parameter).....		
A_P	16.2368168	.....(Fixed Parameter).....		
P_NC05	3.33458021	.....(Fixed Parameter).....		
P_NC15	1.15517636	.....(Fixed Parameter).....		
P_NC25	.92169094	.....(Fixed Parameter).....		
P_NC35	-.50798792	.....(Fixed Parameter).....		
P_R15	-.29705360	23.7235966	-.013	.9900
P_R25	-.45463911	.....(Fixed Parameter).....		
P_R35	-.33017504	.....(Fixed Parameter).....		
P_R45	.05286972	.....(Fixed Parameter).....		
P_SX5	.19860152	.....(Fixed Parameter).....		
P_ID25	.39372740	.....(Fixed Parameter).....		
P_ID35	.83042684	.....(Fixed Parameter).....		
P_ID45	.93540710	.....(Fixed Parameter).....		
P_ID55	1.38866555	.....(Fixed Parameter).....		
P_IN15	-.59594969	.....(Fixed Parameter).....		
P_IN25	.30824210	.....(Fixed Parameter).....		
P_IN35	.30881567	.....(Fixed Parameter).....		
P_LC5	-1.96737126	.....(Fixed Parameter).....		

```
P_ES25  |     .67805262    ......(Fixed Parameter).......
P_LZ25  |     .37754071    ......(Fixed Parameter).......
P_CS25  |     .10004788    ......(Fixed Parameter).......
P_D25   |   -4.59294577    ......(Fixed Parameter).......
P_DX15  |    18.9999584    ......(Fixed Parameter).......
P_DX25  |   -11.0996680    ......(Fixed Parameter).......
P_DX35  |   -9.24575068    ......(Fixed Parameter).......
P_V25   |    -.09503724    ......(Fixed Parameter).......
P_TBA5  |    1.29964589     .424300D-06  ********   .0000
P_FTL5  |    -.08849205      4.86796592     -.018   .9855
```

MNL11.5a – Combinação de Variáveis socioeconómicas, TC e Viagem

- ASC

- Idi - Var. binária escalão etário (expto Id1)
- Ini - Var. binária nível de instrução (expto In4)
- Sexo - Var. binária Sexo
- Ri - Var. binária escalões do rend. Liquí. mensal do agreg (expto R5)
- Lc - Var. binária de disponibilidade de Licença de condução (Lc)
- NCia - Var. binária nº auto disponíveis diariamente no agregado per capita (expto NC4a).

- TBA – Variável continua com a razão dos tempos médios de viagem em BUS e AUTO entre zona de Geração e Atracção

- Ftl – Variável continua inicial sobre a frequência média horária de TC durante o período laboral (7h30-19h30)

- V2 – Variável continua para velocidade comercial equivalente de BUS em km/h

- d2 -Var. continua para distância + curta entre centróides (excepto pedonais 3,6km/h)
- dx1 - Var.bin distância + curta entre centróides (expto ped.3,6km/h) <=1,0km
- dx2 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >1,0km e <= 2,0km
- dx3 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >2,0km e <=5,0km
- dx4 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >5,0km (excluída)

- Tia – Variável continua genérica duração média apreendida da viagem por modo (min) entre GA com a duração apreendida real qd é o modo escolhido

Tr - Trab viagens com motivo ir para o trabalho (excluída)
Es - Escola viagens com motivo ir para a escola
La - Lazer viagens com motivo lazer
CS - Cp_Sv viagens com motivo ir para às compras ou a serviços

```
+---------------------------------------------+
| Discrete choice and multinomial logit models|
+---------------------------------------------+
Hessian is not definite at current values.
Switching to BFGS (gradient based) method.
(Not a failure. Just looking for a better algorithm.)
Note: DFP and BFGS usually take more than 4 or 5
iterations to converge.  If this problem was not
structured for quick convergence, you might want
to examine results closely. If convergence is too
early, tighten convergence with, e.g., ;TLG=1.D-9.
Normal exit from iterations. Exit status=0.
+---------------------------------------------+
| Discrete choice (multinomial logit) model   |
| Maximum Likelihood Estimates                |
| Model estimated: Jan 13, 2012 at 10:34:34AM.|
| Dependent variable              Choice      |
```

```
| Weighting variable                None     |
| Number of observations           10264     |
| Iterations completed                 1     |
| Log likelihood function       -7078.561    |
| Number of parameters               141     |
| Info. Criterion: AIC =          1.40677    |
|   Finite Sample: AIC =          1.40716    |
| Info. Criterion: BIC =          1.50618    |
| Info. Criterion:HQIC =          1.44038    |
| R2=1-LogL/LogL*  Log-L fncn  R-sqrd  RsqAdj |
| Constants only  -12738.8690  .44433  .44280 |
| Chi-squared[**]          =  11320.61529     |
| Prob [ chi squared > value ] =   .00000     |
| Response data are given as ind. choice.     |
| Number of obs.= 95426, skipped**** bad obs. |
+---------------------------------------------+

+---------------------------------------------+
| Notes No coefficients=> P(i,j)=1/J(i).      |
|       Constants only => P(i,j) uses ASCs    |
|         only. N(j)/N if fixed choice set.   |
|         N(j) = total sample frequency for j |
|         N    = total sample frequency.      |
|       These 2 models are simple MNL models. |
|       R-sqrd = 1 - LogL(model)/logL(other)  |
|       RsqAdj=1-[nJ/(nJ-nparm)]*(1-R-sqrd)   |
|         nJ   = sum over i, choice set sizes |
+---------------------------------------------+
+--------+--------------+----------------+--------+--------+
|Variable| Coefficient  | Standard Error |b/St.Er.|P[|Z|>z]|
+--------+--------------+----------------+--------+--------+
 ATTRIB01|     .01906493      1.00000000      .019   .9848
 A_BP    |   -35.2491702    ......(Fixed Parameter).......
 BP_NC01 |    32.8309809    ......(Fixed Parameter).......
 BP_NC11 |    31.3484504    ......(Fixed Parameter).......
 BP_NC21 |    30.7163799    ......(Fixed Parameter).......
 BP_NC31 |    29.8681172    ......(Fixed Parameter).......
 BP_R11  |     .19670678    ......(Fixed Parameter).......
 BP_R21  |     .35656334    ......(Fixed Parameter).......
 BP_R31  |     .11146868    ......(Fixed Parameter).......
 BP_R41  |    -.73475408    ......(Fixed Parameter).......
 BP_SX1  |     .79603587    ......(Fixed Parameter).......
 BP_ID21 |    2.53308465    ......(Fixed Parameter).......
 BP_ID31 |    2.58064746    ......(Fixed Parameter).......
 BP_ID41 |    2.67689422    ......(Fixed Parameter).......
 BP_ID51 |    2.18942095    ......(Fixed Parameter).......
 BP_IN11 |     .50881925    ......(Fixed Parameter).......
 BP_IN21 |     .25489628    ......(Fixed Parameter).......
 BP_IN31 |    -.00559393      1.00000000     -.006   .9955
 BP_LC1  |   -2.69649631    ......(Fixed Parameter).......
 BP_ES1  |     .39155562    ......(Fixed Parameter).......
 BP_LZ1  |    -.48684103    ......(Fixed Parameter).......
 BP_CS1  |    -.27986527    ......(Fixed Parameter).......
 BP_D21  |    -.12055299    ......(Fixed Parameter).......
 BP_DX11 |    -.75695478    ......(Fixed Parameter).......
 BP_DX21 |    -.46013134    ......(Fixed Parameter).......
 BP_DX31 |    -.37275336    ......(Fixed Parameter).......
```

BP_V21	-.04329882	.....(Fixed Parameter).....			
BP_TBA1	-.47686049	.....(Fixed Parameter).....			
BP_FTL1	.00665302	.....(Fixed Parameter).....			
A_B	-.79535469	.....(Fixed Parameter).....			
B_NC02	3.53776170	.....(Fixed Parameter).....			
B_NC12	1.93583828	.....(Fixed Parameter).....			
B_NC22	1.54817935	.....(Fixed Parameter).....			
B_NC32	.80773653	.....(Fixed Parameter).....			
B_R12	.54838310	.....(Fixed Parameter).....			
B_R22	.32147099	.....(Fixed Parameter).....			
B_R32	.35881881	.....(Fixed Parameter).....			
B_R42	.39681504	.....(Fixed Parameter).....			
B_SX2	.48613583	.....(Fixed Parameter).....			
B_ID22	1.86696809	.....(Fixed Parameter).....			
B_ID32	1.65407254	.....(Fixed Parameter).....			
B_ID42	1.55782254	.....(Fixed Parameter).....			
B_ID52	1.54191865	.....(Fixed Parameter).....			
B_IN12	-.42915330	.....(Fixed Parameter).....			
B_IN22	-.18353506	.....(Fixed Parameter).....			
B_IN32	.01032984	.....(Fixed Parameter).....			
B_LC2	-2.28550096	.....(Fixed Parameter).....			
B_ES2	.48673210	.....(Fixed Parameter).....			
B_LZ2	-.51029871	.....(Fixed Parameter).....			
B_CS2	-.21146106	.....(Fixed Parameter).....			
B_D22	.15687469	.....(Fixed Parameter).....			
B_DX12	-.84722146	.....(Fixed Parameter).....			
B_DX22	-2.61982206	.....(Fixed Parameter).....			
B_DX32	-.30888310	.....(Fixed Parameter).....			
B_V22	-.13111333	.....(Fixed Parameter).....			
B_TBA2	-1.42724619	.....(Fixed Parameter).....			
B_FTL2	-.01268577	.....(Fixed Parameter).....			
A_BO	-5.54084335	.....(Fixed Parameter).....			
BO_NC03	2.58528183	.....(Fixed Parameter).....			
BO_NC13	1.79042000	.....(Fixed Parameter).....			
BO_NC23	1.04311552	.....(Fixed Parameter).....			
BO_NC33	.26386097	.....(Fixed Parameter).....			
BO_R13	.42725987	.....(Fixed Parameter).....			
BO_R23	.06904980	.....(Fixed Parameter).....			
BO_R33	-.21101197	.....(Fixed Parameter).....			
BO_R43	-.19038927	.....(Fixed Parameter).....			
BO_SX3	-.60277227	.....(Fixed Parameter).....			
BO_ID23	1.07948311	.....(Fixed Parameter).....			
BO_ID33	.84675000	.....(Fixed Parameter).....			
BO_ID43	.63372349	.....(Fixed Parameter).....			
BO_ID53	-1.30413399	.....(Fixed Parameter).....			
BO_IN13	.07542007	.....(Fixed Parameter).....			
BO_IN23	.61773532	.....(Fixed Parameter).....			
BO_IN33	-.79009743	.....(Fixed Parameter).....			
BO_LC3	-1.50740625	5.23034803	-.288	.7732	
BO_ES3	.50214430	23.8528213	.021	.9832	
BO_LZ3	-1.45751780	51.3346805	-.028	.9773	
BO_CS3	-.92036019	20.5264264	-.045	.9642	
BO_D23	.22483919	.....(Fixed Parameter).....			
BO_DX13	1.60853333	7.40070210	.217	.8279	
BO_DX23	1.32115176	.....(Fixed Parameter).....			
BO_DX33	.59433921	.....(Fixed Parameter).....			
BO_V23	-.02611399	.....(Fixed Parameter).....			

BO_TBA3	.08746794	.....(Fixed Parameter).....		
BO_FTL3	-.11667671	.....(Fixed Parameter).....		
A_M	-8.86321006	23.0849145	-.384	.7010
M_NC04	3.44809682	.....(Fixed Parameter).....		
M_NC14	1.73261478	.....(Fixed Parameter).....		
M_NC24	1.39957339	.....(Fixed Parameter).....		
M_NC34	1.12591857	.....(Fixed Parameter).....		
M_R14	-.18533699	3.56902776	-.052	.9586
M_R24	.23618486	.....(Fixed Parameter).....		
M_R34	.30544759	.49303422	.620	.5356
M_R44	.21876324	1.09113828	.200	.8411
M_SX4	-1.11247184	3.64819597	-.305	.7604
M_ID24	3.14204395	.....(Fixed Parameter).....		
M_ID34	4.34279518	.....(Fixed Parameter).....		
M_ID44	3.56411869	.....(Fixed Parameter).....		
M_ID54	2.45865801	11.4749330	.214	.8303
M_IN14	1.88496376	.....(Fixed Parameter).....		
M_IN24	1.22191843	.....(Fixed Parameter).....		
M_IN34	.22806235	.....(Fixed Parameter).....		
M_LC4	-2.28584089	.....(Fixed Parameter).....		
M_ES4	-1.85946559	.....(Fixed Parameter).....		
M_LZ4	-.39082386	.....(Fixed Parameter).....		
M_CS4	-.45707901	.....(Fixed Parameter).....		
M_D24	.10670465	.....(Fixed Parameter).....		
M_DX14	2.14831451	.....(Fixed Parameter).....		
M_DX24	1.53580701	.....(Fixed Parameter).....		
M_DX34	1.24231177	2.08301172	.596	.5509
M_V24	.01788145	.....(Fixed Parameter).....		
M_TBA4	-.03148904	.....(Fixed Parameter).....		
M_FTL4	-.05927538	.....(Fixed Parameter).....		
A_P	15.9697045	.....(Fixed Parameter).....		
P_NC05	3.04593510	.....(Fixed Parameter).....		
P_NC15	1.07025446	.....(Fixed Parameter).....		
P_NC25	.91282940	.....(Fixed Parameter).....		
P_NC35	-.62250854	.....(Fixed Parameter).....		
P_R15	-.35466694	24.7254205	-.014	.9886
P_R25	-.42350783	.....(Fixed Parameter).....		
P_R35	-.35183484	.....(Fixed Parameter).....		
P_R45	-.02658936	.....(Fixed Parameter).....		
P_SX5	.13548830	.....(Fixed Parameter).....		
P_ID25	.54359385	.....(Fixed Parameter).....		
P_ID35	.70794352	.....(Fixed Parameter).....		
P_ID45	.76074007	.....(Fixed Parameter).....		
P_ID55	1.23152507	.....(Fixed Parameter).....		
P_IN15	-.25212659	.....(Fixed Parameter).....		
P_IN25	.28482174	.....(Fixed Parameter).....		
P_IN35	.40455568	.....(Fixed Parameter).....		
P_LC5	-2.10755982	.....(Fixed Parameter).....		
P_ES5	-.09600294	.....(Fixed Parameter).....		
P_LZ5	.10903805	.....(Fixed Parameter).....		
P_CS5	-.24733544	.....(Fixed Parameter).....		
P_D25	-4.57858088	.....(Fixed Parameter).....		
P_DX15	19.5030166	.....(Fixed Parameter).....		
P_DX25	-10.9892782	.....(Fixed Parameter).....		
P_DX35	-9.03310608	.....(Fixed Parameter).....		
P_V25	-.06226419	.....(Fixed Parameter).....		
P_TBA5	1.48492140	.367821D-06	********	.0000

```
 P_FTL5  |    -.08003488      5.04603275     -.016    .9873
```

MNL11.6 – Combinação de Variáveis socioeconómicas, TC e Viagem

- ASC

- Idi - Var. binária escalão etário (expto Id1)
- Ini - Var. binária nível de instrução (expto In4)
- Sexo - Var. binária Sexo
- Ri - Var. binária escalões do rend. Liquí. mensal do agreg (expto R5)
- Lc - Var. binária de disponibilidade de Licença de condução (Lc)
- NCia - Var. binária nº auto disponíveis diariamente no agregado per capita (expto NC4a).

- TBA – Variável continua com a razão dos tempos médios de viagem em BUS e AUTO entre zona de Geração e Atracção

- Fm – Variável continua inicial sobre a frequência média horária de TC na hora de ponta da manhã (7h30-9h30)

- V2 – Variável continua para velocidade comercial equivalente de BUS em km/h

- d2 -Var. continua para distância + curta entre centróides (excepto pedonais 3,6km/h)
- dx1 - Var.bin distância + curta entre centróides (expto ped.3,6km/h) <=1,0km
- dx2 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >1,0km e <= 2,0km
- dx3 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >2,0km e <=5,0km
- dx4 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >5,0km (excluída)

```
DISCRETECHOICE
;Lhs=MTRP
;Choices=Bp,B,Bo,M,P,A[1]
;Rh2=ONE,NC0,NC1,NC2,NC3,R1,R2,R3,R4,SX,ID2,ID3,ID4,ID5,IN1,IN2,IN3,LC,D2,DX1,DX2,D
X3,V2,TBA,FM$
+---------------------------------------------+
| Discrete choice and multinomial logit models|
+---------------------------------------------+
Normal exit from iterations. Exit status=0.
+---------------------------------------------+
| Discrete choice (multinomial logit) model   |
| Maximum Likelihood Estimates                |
| Model estimated: Feb 09, 2012 at 10:17:23AM.|
| Dependent variable               Choice     |
| Weighting variable                 None     |
| Number of observations            40099     |
| Iterations completed                 32     |
| Log likelihood function       -27848.21     |
| Number of parameters                125     |
| Info. Criterion: AIC =          1.39521     |
|   Finite Sample: AIC =          1.39523     |
| Info. Criterion: BIC =          1.42201     |
| Info. Criterion:HQIC =          1.40369     |
| R2=1-LogL/LogL*  Log-L fncn  R-sqrd  RsqAdj |
| Constants only  -50751.5442  .45128  .45094 |
| Chi-squared[**]          =  45806.66008     |
| Prob [ chi squared > value ] =   .00000     |
```

```
| Response data are given as ind. choice.     |
| Number of obs.= 95426, skipped**** bad obs. |
+---------------------------------------------+

+---------------------------------------------+
| Notes No coefficients=> P(i,j)=1/J(i).      |
|       Constants only => P(i,j) uses ASCs    |
|         only. N(j)/N if fixed choice set.   |
|         N(j) = total sample frequency for j |
|         N    = total sample frequency.      |
|       These 2 models are simple MNL models. |
|       R-sqrd = 1 - LogL(model)/logL(other)  |
|       RsqAdj=1-[nJ/(nJ-nparm)]*(1-R-sqrd)   |
|         nJ   = sum over i, choice set sizes |
+---------------------------------------------+
```

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]
A_BP	-6.48711108	1.08423590	-5.983	.0000
BP_NC01	5.09419821	1.00464959	5.071	.0000
BP_NC11	3.12054708	1.00641694	3.101	.0019
BP_NC21	2.58626353	1.00557817	2.572	.0101
BP_NC31	1.76631961	1.03361940	1.709	.0875
BP_R11	.52038086	.18052511	2.883	.0039
BP_R21	.60729435	.15367871	3.952	.0001
BP_R31	.63555641	.15673549	4.055	.0001
BP_R41	.47109463	.18209980	2.587	.0097
BP_SX1	.55985069	.07549971	7.415	.0000
BP_ID21	2.14264545	.24256045	8.833	.0000
BP_ID31	1.82468443	.24640985	7.405	.0000
BP_ID41	1.83076738	.23850594	7.676	.0000
BP_ID51	2.00865320	.25092838	8.005	.0000
BP_IN11	.28055370	.30134614	.931	.3519
BP_IN21	.74193684	.22561397	3.289	.0010
BP_IN31	.81395522	.23410689	3.477	.0005
BP_LC1	-2.09504606	.09510443	-22.029	.0000
BP_D21	.26471010	.01626206	16.278	.0000
BP_DX11	-1.27012027	1.02157782	-1.243	.2138
BP_DX21	.02089817	.16792188	.124	.9010
BP_DX31	.25955785	.10754065	2.414	.0158
BP_V21	-.14183999	.01210183	-11.721	.0000
BP_TBA1	-1.40211014	.10592476	-13.237	.0000
BP_FM1	.00829400	.00515386	1.609	.1076
A_B	-1.62155437	.22134489	-7.326	.0000
B_NC02	3.67411303	.14922896	24.621	.0000
B_NC12	1.85212930	.14957885	12.382	.0000
B_NC22	1.47421921	.14741787	10.000	.0000
B_NC32	.81046125	.15996133	5.067	.0000
B_R12	.48435628	.07737019	6.260	.0000
B_R22	.32504013	.05370657	6.052	.0000
B_R32	.33314323	.05478551	6.081	.0000
B_R42	.25650184	.06281615	4.083	.0000
B_SX2	.46551677	.03429754	13.573	.0000
B_ID22	1.97654857	.09551329	20.694	.0000
B_ID32	1.73392690	.09690887	17.892	.0000
B_ID42	1.68296157	.09332035	18.034	.0000
B_ID52	1.99454199	.10364185	19.245	.0000

B_IN12	-.15700155	.11692149	-1.343	.1793
B_IN22	.12808143	.06706795	1.910	.0562
B_IN32	.41582532	.06951185	5.982	.0000
B_LC2	-2.01886827	.04212343	-47.927	.0000
B_D22	.13555727	.01046442	12.954	.0000
B_DX12	-1.20383626	.25791434	-4.668	.0000
B_DX22	-.89920241	.08520702	-10.553	.0000
B_DX32	-.35830359	.05297567	-6.764	.0000
B_V22	-.12983926	.00549243	-23.640	.0000
B_TBA2	-1.11043133	.04742409	-23.415	.0000
B_FM2	.03176949	.00241156	13.174	.0000
A_BO	-5.88165124	.49338247	-11.921	.0000
BO_NC03	1.53871275	.26602541	5.784	.0000
BO_NC13	.34427265	.26606925	1.294	.1957
BO_NC23	-.22261346	.26252056	-.848	.3964
BO_NC33	-.44569143	.29910852	-1.490	.1362
BO_R13	.36573131	.17690449	2.067	.0387
BO_R23	.10225311	.13057855	.783	.4336
BO_R33	.12168340	.13464576	.904	.3661
BO_R43	.21967416	.15586833	1.409	.1587
BO_SX3	-.49873129	.08211624	-6.073	.0000
BO_ID23	.84356836	.17160163	4.916	.0000
BO_ID33	.17822584	.19095945	.933	.3507
BO_ID43	.14650402	.17908658	.818	.4133
BO_ID53	-1.31212148	.32442558	-4.044	.0001
BO_IN13	1.00751139	.35382298	2.848	.0044
BO_IN23	1.41988343	.29169836	4.868	.0000
BO_IN33	.36786693	.31796161	1.157	.2473
BO_LC3	-1.23497896	.10846461	-11.386	.0000
BO_D23	.18154213	.01609286	11.281	.0000
BO_DX13	-28.4759152	.190520D+07	.000	1.0000
BO_DX23	1.04536855	.19357513	5.400	.0000
BO_DX33	.83562717	.11295182	7.398	.0000
BO_V23	-.00125776	.01160873	-.108	.9137
BO_TBA3	.35416284	.09537476	3.713	.0002
BO_FM3	-.07913328	.01010264	-7.833	.0000
A_M	-9.30284465	.62684135	-14.841	.0000
M_NC04	2.74044528	.31559707	8.683	.0000
M_NC14	1.05361952	.31863066	3.307	.0009
M_NC24	.67077546	.31504586	2.129	.0332
M_NC34	.70144131	.33534828	2.092	.0365
M_R14	-.13022310	.15899227	-.819	.4128
M_R24	.21187970	.12050720	1.758	.0787
M_R34	-.02321726	.12838270	-.181	.8565
M_R44	.12793501	.14974623	.854	.3929
M_SX4	-1.25840546	.07642821	-16.465	.0000
M_ID24	3.23842589	.38753700	8.356	.0000
M_ID34	4.40889245	.38500467	11.452	.0000
M_ID44	3.89795776	.38276668	10.184	.0000
M_ID54	2.92495118	.40163321	7.283	.0000
M_IN14	2.18949061	.36900803	5.933	.0000
M_IN24	2.00900197	.31084772	6.463	.0000
M_IN34	1.34728342	.32238789	4.179	.0000
M_LC4	-2.07003844	.08242781	-25.113	.0000
M_D24	-.02181155	.02428242	-.898	.3691
M_DX14	-28.7929151	.148081D+07	.000	1.0000
M_DX24	1.03657614	.17318066	5.986	.0000

M_DX34	.65168107	.11247704	5.794	.0000
M_V24	.04364493	.00877863	4.972	.0000
M_TBA4	.30399472	.08143927	3.733	.0002
M_FM4	-.05680742	.00742551	-7.650	.0000
A_P	3.65322288	.48288667	7.565	.0000
P_NC05	2.75911284	.17321515	15.929	.0000
P_NC15	1.05575782	.17727242	5.956	.0000
P_NC25	.69825912	.17261323	4.045	.0001
P_NC35	.19460546	.21000173	.927	.3541
P_R15	.61426065	.11841771	5.187	.0000
P_R25	.54764239	.09247536	5.922	.0000
P_R35	.29986331	.09536963	3.144	.0017
P_R45	.39324328	.10830644	3.631	.0003
P_SX5	.28029448	.05529377	5.069	.0000
P_ID25	1.52237647	.14619546	10.413	.0000
P_ID35	1.11727502	.15126910	7.386	.0000
P_ID45	1.40530291	.14400710	9.759	.0000
P_ID55	1.58332991	.15476696	10.230	.0000
P_IN15	-.04601707	.18080304	-.255	.7991
P_IN25	.18023183	.10734082	1.679	.0931
P_IN35	.24497127	.11292615	2.169	.0301
P_LC5	-1.79431426	.07078399	-25.349	.0000
P_D25	-1.40065774	.08391856	-16.691	.0000
P_DX15	-.11828419	.39778079	-.297	.7662
P_DX25	-2.16725108	.32488319	-6.671	.0000
P_DX35	-2.92344899	.26174541	-11.169	.0000
P_V25	-.20410222	.01743178	-11.709	.0000
P_TBA5	-.19497190	.06801949	-2.866	.0042
P_FM5	.02105823	.00341072	6.174	.0000

MNL11.1 (BWA) – Combinação de Variáveis socioeconómicas, TC e Viagem

- ASC

- Lc - Var. binária de disponibilidade de Licença de condução (Lc)
- NCia - Var. binária nº auto disponíveis diariamente no agregado per capita (expto NC4a).

- TBA – Variável continua com a razão dos tempos médios de viagem em BUS e AUTO entre zona de Geração e Atracção

- Fm – Variável continua inicial sobre a frequência média horária de TC na hora de ponta da manhã (7h30-9h30)

- V2 – Variável continua para velocidade comercial equivalente de BUS em km/h

- d2 -Var. continua para distância + curta entre centróides (excepto pedonais 3,6km/h)
- dx1 - Var.bin distância + curta entre centróides (expto ped.3,6km/h) <=1,0km
- dx2 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >1,0km e <= 2,0km
- dx3 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >2,0km e <=5,0km
- *dx4a - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >5,0km (excluída)*

```
DISCRETECHOICE
;Lhs=MTRP
;Choices=B,W,A[1]
;Rh2=ONE,NC0,NC1,NC2,NC3,LC,D2,DX1,DX2,DX3,V2,TBA,FM$
+---------------------------------------------+
| Discrete choice and multinomial logit models|
+---------------------------------------------+
Normal exit from iterations. Exit status=0.
+---------------------------------------------+
| Discrete choice (multinomial logit) model   |
| Maximum Likelihood Estimates                |
| Model estimated: Feb 09, 2012 at 08:16:14PM.|
| Dependent variable               Choice     |
| Weighting variable                 None     |
| Number of observations            37226     |
| Iterations completed                  9     |
| Log likelihood function       -17547.07     |
| Number of parameters                 26     |
| Info. Criterion: AIC =           .94413     |
|   Finite Sample: AIC =           .94413     |
| Info. Criterion: BIC =           .95008     |
| Info. Criterion:HQIC =           .94602     |
| R2=1-LogL/LogL*  Log-L fncn  R-sqrd  RsqAdj |
| Constants only  -37290.4129  .52945  .52928 |
| Chi-squared[24]          =  39486.68692     |
| Prob [ chi squared > value ] =   .00000     |
| Response data are given as ind. choice.     |
| Number of obs.= 83169, skipped**** bad obs. |
+---------------------------------------------+

+---------------------------------------------+
| Notes No coefficients=> P(i,j)=1/J(i).      |
```

```
|       Constants only => P(i,j) uses ASCs    |
|         only. N(j)/N if fixed choice set.   |
|         N(j) = total sample frequency for j |
|         N    = total sample frequency.      |
|       These 2 models are simple MNL models. |
|       R-sqrd = 1 - LogL(model)/logL(other)  |
|       RsqAdj=1-[nJ/(nJ-nparm)]*(1-R-sqrd)   |
|         nJ   = sum over i, choice set sizes |
+---------------------------------------------+
```

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]
A_B	.71737812	.19556024	3.668	.0002
B_NC01	3.73893302	.14634336	25.549	.0000
B_NC11	1.83264116	.14698814	12.468	.0000
B_NC21	1.40179584	.14555448	9.631	.0000
B_NC31	.67972181	.15774940	4.309	.0000
B_LC1	-1.89935742	.03330452	-57.030	.0000
B_D21	.13291003	.01072628	12.391	.0000
B_DX11	-1.23382336	.25717517	-4.798	.0000
B_DX21	-.91393522	.08503970	-10.747	.0000
B_DX31	-.39251900	.05285446	-7.426	.0000
B_V21	-.12862330	.00546806	-23.523	.0000
B_TBA1	-1.10524466	.04700937	-23.511	.0000
B_FM1	.02811253	.00234877	11.969	.0000
A_W	5.20072971	.45654623	11.391	.0000
W_NC02	2.87683782	.16975450	16.947	.0000
W_NC12	1.01862839	.17246248	5.906	.0000
W_NC22	.60268027	.16891969	3.568	.0004
W_NC32	-.02330650	.20523560	-.114	.9096
W_LC2	-1.74274744	.05772719	-30.189	.0000
W_D22	-1.37232688	.08359017	-16.417	.0000
W_DX12	.14513253	.39682514	.366	.7146
W_DX22	-1.94520877	.32440690	-5.996	.0000
W_DX32	-2.79023827	.26075677	-10.701	.0000
W_V22	-.18491505	.01741821	-10.616	.0000
W_TBA2	-.15761412	.06806969	-2.315	.0206
W_FM2	.01593289	.00336572	4.734	.0000

MNL11.6 (BWA) – Combinação de Variáveis socioeconómicas, TC e Viagem

- ASC

- Idi - Var. binária escalão etário (expto Id1)
- Ini - Var. binária nível de instrução (expto In4)
- Sexo - Var. binária Sexo
- Ri - Var. binária escalões do rend. Liquí. mensal do agreg (expto R5)
- Lc - Var. binária de disponibilidade de Licença de condução (Lc)
- NCia - Var. binária nº auto disponíveis diariamente no agregado per capita (expto NC4a).

- TBA – Variável continua com a razão dos tempos médios de viagem em BUS e AUTO entre zona de Geração e Atracção

- Fm – Variável continua inicial sobre a frequência média horária de TC na hora de ponta da manhã (7h30-9h30)

- V2 – Variável continua para velocidade comercial equivalente de BUS em km/h

- d2 -Var. continua para distância + curta entre centróides (excepto pedonais 3,6km/h)
- dx1 - Var.bin distância + curta entre centróides (expto ped.3,6km/h) <=1,0km
- dx2 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >1,0km e <= 2,0km
- dx3 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >2,0km e <=5,0km
- dx4 - Var.bin dist. + curta entre centróides (expto ped.3,6km/h) >5,0km (excluída)

```
DISCRETECHOICE
;Lhs=MTRP
;Choices=B,W,A[1]
;Rh2=ONE,NC0,NC1,NC2,NC3,R1,R2,R3,R4,SX,ID2,ID3,ID4,ID5,IN1,IN2,IN3,LC,D2,DX1,DX2,D
X3,V2,TBA,FM$
+---------------------------------------------+
| Discrete choice and multinomial logit models|
+---------------------------------------------+
Normal exit from iterations. Exit status=0.
+---------------------------------------------+
| Discrete choice (multinomial logit) model   |
| Maximum Likelihood Estimates                |
| Model estimated: Feb 09, 2012 at 08:22:30PM.|
| Dependent variable               Choice     |
| Weighting variable                 None     |
| Number of observations            37226     |
| Iterations completed                  9     |
| Log likelihood function       -16807.42     |
| Number of parameters                 50     |
| Info. Criterion: AIC =           .90568     |
|   Finite Sample: AIC =           .90568     |
| Info. Criterion: BIC =           .91713     |
| Info. Criterion:HQIC =           .90932     |
| R2=1-LogL/LogL*  Log-L fncn  R-sqrd  RsqAdj |
| Constants only  -37290.4129  .54928  .54898 |
| Chi-squared[48]          =  40965.99349     |
| Prob [ chi squared > value ] =   .00000     |
```

```
| Response data are given as ind. choice.     |
| Number of obs.= 83169, skipped**** bad obs. |
+---------------------------------------------+

+---------------------------------------------+
| Notes No coefficients=> P(i,j)=1/J(i).      |
|       Constants only => P(i,j) uses ASCs    |
|         only. N(j)/N if fixed choice set.   |
|         N(j) = total sample frequency for j |
|         N    = total sample frequency.      |
|       These 2 models are simple MNL models. |
|       R-sqrd = 1 - LogL(model)/logL(other)  |
|       RsqAdj=1-[nJ/(nJ-nparm)]*(1-R-sqrd)   |
|         nJ   = sum over i, choice set sizes |
+---------------------------------------------+
```

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]
A_B	-1.57151010	.22463433	-6.996	.0000
B_NC01	3.67597581	.14939704	24.605	.0000
B_NC11	1.86437340	.14972225	12.452	.0000
B_NC21	1.48701880	.14745264	10.085	.0000
B_NC31	.83335517	.15997702	5.209	.0000
B_R11	.47824585	.07849676	6.093	.0000
B_R21	.32759225	.05439531	6.022	.0000
B_R31	.33480361	.05544639	6.038	.0000
B_R41	.27039695	.06351479	4.257	.0000
B_SX1	.45627903	.03515262	12.980	.0000
B_ID21	1.94368273	.09751682	19.932	.0000
B_ID31	1.70751095	.09896701	17.253	.0000
B_ID41	1.63878974	.09526147	17.203	.0000
B_ID51	1.95303947	.10527242	18.552	.0000
B_IN11	-.20087980	.11967826	-1.678	.0932
B_IN21	.12438418	.06740896	1.845	.0650
B_IN31	.40637516	.06983488	5.819	.0000
B_LC1	-1.99280746	.04294275	-46.406	.0000
B_D21	.13360786	.01109626	12.041	.0000
B_DX11	-1.23574981	.25894150	-4.772	.0000
B_DX21	-.92512987	.08810728	-10.500	.0000
B_DX31	-.39061216	.05497318	-7.106	.0000
B_V21	-.13124842	.00569810	-23.034	.0000
B_TBA1	-1.10161010	.04853707	-22.696	.0000
B_FM1	.03133124	.00243475	12.868	.0000
A_W	3.21644320	.48717687	6.602	.0000
W_NC02	2.73584942	.17480085	15.651	.0000
W_NC12	1.05421378	.17881845	5.895	.0000
W_NC22	.68310189	.17386070	3.929	.0001
W_NC32	.20327637	.21154079	.961	.3366
W_R12	.65777799	.12070808	5.449	.0000
W_R22	.61085590	.09369719	6.519	.0000
W_R32	.33109773	.09652830	3.430	.0006
W_R42	.38690526	.10966090	3.528	.0004
W_SX2	.33097836	.05692555	5.814	.0000
W_ID22	1.54724518	.14965823	10.339	.0000
W_ID32	1.12317065	.15496946	7.248	.0000
W_ID42	1.38451168	.14747431	9.388	.0000
W_ID52	1.56580553	.15821617	9.897	.0000

W_IN12	-.08130776	.18502142	-.439	.6603
W_IN22	.15617097	.10819273	1.443	.1489
W_IN32	.24315375	.11373258	2.138	.0325
W_LC2	-1.75549107	.07294828	-24.065	.0000
W_D22	-1.37872363	.08455101	-16.306	.0000
W_DX12	.16573428	.40006256	.414	.6787
W_DX22	-1.94811014	.32681728	-5.961	.0000
W_DX32	-2.78038573	.26203594	-10.611	.0000
W_V22	-.18483940	.01777327	-10.400	.0000
W_TBA2	-.16180696	.06959871	-2.325	.0201
W_FM2	.01988474	.00345454	5.756	.0000

MNL11.7 – Base de dados apenas com inquéritos com PO e OV e Ftl1

- ASC

- Variáveis binárias do escalão etário (excepto Id1)
- Variáveis binárias do nível de instrução (excepto In4)
- Variável binária Sexo (Sexo)
- Variável binária de disponibilidade de Licença de condução (Lc)
- ~~Var. binárias para escalões do rendimento liquido mensal do agregado (excepto R5)~~
- Var.binária para nº auto disponíveis diariamente no agregado p/ capita (expto NC4a)
- ~~Var. Binária de disponibilidade diária de Moto no agregado (Mot).~~

- D2: Variável continua distância mais curta em Km entre os centróides ajustados das zonas de Geração e de Atracção (pares >=50 viagens) excepto para o modo Walk em que d2=tp/60*3,6km/h

- ~~Til – Variável continua genérica **Ln**(duração média apreendida da viagem por modo (min) entre GA com a duração apreendida real qd é o modo escolhido)~~

- ~~*De1 : variável binária duracão da estadia <=60min (curta duração) (excluída)*~~
- ~~De2 : variável binária duracão da estadia >60min & <=120min (média duração)~~
- ~~De3 : variável binária duracão da estadia >120min & <=240min (média duração)~~
- ~~De4 : variável binária duracão da estadia >240min & <=480min (longa duração)~~
- ~~De5: variável binária duracão da estadia >480min (muito longa duração)~~

- nV: ntotalviag variável continua Número total de viagens de cada indivíduo por dia

- Tr: Variável binária para viagens para trabalho
- Rg:Variável binária para viagens de Regresso a casa
- Es: Variável binária para viagens para a escola
- *Lz: Variável binária para viagens em lazer (exluída)*
- CS: Variável binária para viagens para compras/serviços

- TBA: Variável continua Razão tempos médios de viagem em Bus/AUTO entre as zonas de Geração e Atracção

- Ftl1 : Frequência média horária de TC potencialmente à disposição entre a zona de geração e de atracção entre as 7:30 e as 19:30 (nfreq7301930/12) ***com valores em GA muito próximas***

```
DISCRETECHOICE
;Lhs=MTRP
;Choices=Bp,B,Bo,M,P,A[1]
;Rh2=ONE,NC0,NC1,NC2,NC3,SX,ID2,ID3,ID4,ID5,IN1,IN2,IN3,LC,D2,nV,TR,Rg,Es,Cs,Ftl1,TBA$
Normal exit:   9 iterations. Status=0, F=    11934.65

---------------------------------------------------------------------------
Discrete choice (multinomial logit) model
```

```
Dependent variable                Choice
Log likelihood function    -11934.65446
Estimation based on N =  17005, K = 110
Inf.Cr.AIC  =  24089.3 AIC/N =    1.417
Model estimated: Jul 25, 2012, 18:05:12
R2=1-LogL/LogL* Log-L fncn R-sqrd R2Adj
Constants only  **********  .4485 .4478
Chi-squared[**]           =  19410.07188
Prob [ chi squared > value ] =   .00000
Response data are given as ind. choices
Number of obs.= 17055, skipped   50 obs
--------+--------------------------------------------------------------------
        |                Standard            Prob.      95% Confidence
    MTRP|  Coefficient       Error       z    |z|>Z*         Interval
--------+--------------------------------------------------------------------
    A_BP|   -7.10234***     1.10931    -6.40  .0000    -9.27655  -4.92813
 BP_NC01|    5.37296***     1.00687     5.34  .0000     3.39953   7.34638
 BP_NC11|    3.19550***     1.01061     3.16  .0016     1.21474   5.17625
 BP_NC21|    2.66071***     1.00902     2.64  .0084      .68308   4.63835
 BP_NC31|    1.69045       1.05295     1.61  .1084     -.37330   3.75421
  BP_SX1|     .48782***      .10203     4.78  .0000      .28785    .68779
 BP_ID21|    1.49150***      .29546     5.05  .0000      .91240   2.07060
 BP_ID31|    1.65255***      .30494     5.42  .0000     1.05488   2.25022
 BP_ID41|    1.45952***      .29456     4.95  .0000      .88219   2.03685
 BP_ID51|    1.80657***      .30878     5.85  .0000     1.20136   2.41177
 BP_IN11|     .25853         .39555      .65  .5134     -.51674   1.03380
 BP_IN21|    1.16919***      .24134     4.84  .0000      .69617   1.64221
 BP_IN31|    1.11467***      .24999     4.46  .0000      .62470   1.60463
  BP_LC1|   -1.81224***      .12385   -14.63  .0000    -2.05498  -1.56950
  BP_D21|     .11076***      .01315     8.42  .0000      .08499    .13653
  BP_NV1|    -.21501***      .03450    -6.23  .0000     -.28263   -.14740
  BP_TR1|     .58341***      .17743     3.29  .0010      .23566    .93117
  BP_RG1|     .37537**       .15593     2.41  .0161      .06975    .68100
  BP_ES1|     .24154         .22439     1.08  .2817     -.19825    .68133
  BP_CS1|     .14587         .24525      .59  .5520     -.33482    .62656
 BP_FTL1|     .01249***      .00475     2.63  .0086      .00317    .02180
 BP_TBA1|    -.53753***      .14494    -3.71  .0002     -.82160   -.25346
    A_B|   -3.37323***      .28901   -11.67  .0000    -3.93967  -2.80678
 B_NC02|    4.14891***      .18361    22.60  .0000     3.78904   4.50879
 B_NC12|    2.01986***      .18419    10.97  .0000     1.65885   2.38088
 B_NC22|    1.74212***      .17956     9.70  .0000     1.39018   2.09405
 B_NC32|     .84290***      .20136     4.19  .0000      .44823   1.23756
  B_SX2|     .45472***      .05293     8.59  .0000      .35097    .55847
 B_ID22|    2.02551***      .15784    12.83  .0000     1.71615   2.33486
 B_ID32|    2.21341***      .16251    13.62  .0000     1.89490   2.53193
 B_ID42|    2.05627***      .15835    12.99  .0000     1.74591   2.36662
 B_ID52|    2.48011***      .17018    14.57  .0000     2.14657   2.81364
 B_IN12|     .17310         .18962      .91  .3613     -.19855    .54474
 B_IN22|     .48886***      .08109     6.03  .0000      .32993    .64780
 B_IN32|     .53352***      .08323     6.41  .0000      .37039    .69665
  B_LC2|   -1.73033***      .06778   -25.53  .0000    -1.86318  -1.59748
  B_D22|     .02675***      .00911     2.94  .0033      .00889    .04461
  B_NV2|    -.14183***      .01596    -8.88  .0000     -.17312   -.11054
  B_TR2|     .39400***      .09051     4.35  .0000      .21662    .57139
  B_RG2|     .24690***      .07984     3.09  .0020      .09041    .40339
  B_ES2|     .27822**       .11288     2.46  .0137      .05698    .49946
  B_CS2|     .37567***      .12381     3.03  .0024      .13301    .61833
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B_FTL2	.01162***	.00251	4.63	.0000	.00670	.01654
B_TBA2	-.58992***	.07383	-7.99	.0000	-.73462	-.44523
A_BO	-6.00981***	1.29456	-4.64	.0000	-8.54710	-3.47253
BO_NC03	2.67593**	1.04167	2.57	.0102	.63429	4.71757
BO_NC13	2.15246**	1.03553	2.08	.0377	.12285	4.18207
BO_NC23	1.00711	1.03799	.97	.3319	-1.02732	3.04154
BO_NC33	1.67017	1.05668	1.58	.1140	-.40087	3.74122
BO_SX3	.44798**	.22120	2.03	.0428	.01444	.88152
BO_ID23	-.45220	.36386	-1.24	.2139	-1.16535	.26094
BO_ID33	-.88247*	.46621	-1.89	.0584	-1.79623	.03129
BO_ID43	-.86275**	.40539	-2.13	.0333	-1.65731	-.06820
BO_ID53	-.54737	.52557	-1.04	.2977	-1.57748	.48273
BO_IN13	.60499	.58582	1.03	.3017	-.54319	1.75318
BO_IN23	.77872*	.45072	1.73	.0840	-.10468	1.66211
BO_IN33	-.17259	.51957	-.33	.7398	-1.19093	.84575
BO_LC3	-1.02453***	.32507	-3.15	.0016	-1.66166	-.38740
BO_D23	.07756**	.03202	2.42	.0154	.01480	.14033
BO_NV3	-.15718**	.07665	-2.05	.0403	-.30741	-.00694
BO_TR3	.34499	.41129	.84	.4016	-.46112	1.15111
BO_RG3	.19117	.32341	.59	.5545	-.44271	.82504
BO_ES3	.09958	.41992	.24	.8126	-.72346	.92261
BO_CS3	-1.49677	1.04633	-1.43	.1526	-3.54753	.55400
BO_FTL3	-.01512	.01224	-1.23	.2170	-.03911	.00888
BO_TBA3	.63522**	.26125	2.43	.0150	.12318	1.14727
A_M	-7.29484***	1.45972	-5.00	.0000	-10.15584	-4.43384
M_NC04	4.45943***	1.02353	4.36	.0000	2.45336	6.46550
M_NC14	2.43486**	1.03172	2.36	.0183	.41272	4.45700
M_NC24	1.81804*	1.02801	1.77	.0770	-.19683	3.83290
M_NC34	1.83553*	1.05951	1.73	.0832	-.24106	3.91213
M_SX4	-1.64193***	.25803	-6.36	.0000	-2.14767	-1.13619
M_ID24	1.77817**	.87222	2.04	.0415	.06865	3.48770
M_ID34	2.15234**	.87746	2.45	.0142	.43255	3.87214
M_ID44	.57173	.89180	.64	.5215	-1.17616	2.31963
M_ID54	-1.16332	1.31266	-.89	.3755	-3.73609	1.40944
M_IN14	-.38985	1.25027	-.31	.7552	-2.84033	2.06063
M_IN24	.44885	.35418	1.27	.2050	-.24532	1.14302
M_IN34	.48467	.35395	1.37	.1709	-.20907	1.17840
M_LC4	-1.37394***	.23793	-5.77	.0000	-1.84028	-.90761
M_D24	-.02466	.03805	-.65	.5170	-.09923	.04992
M_NV4	.26091***	.04611	5.66	.0000	.17055	.35128
M_TR4	.55114*	.29658	1.86	.0631	-.03014	1.13242
M_RG4	.03233	.27760	.12	.9073	-.51176	.57641
M_ES4	-.75444*	.44673	-1.69	.0913	-1.63001	.12113
M_CS4	-.79580	.75609	-1.05	.2926	-2.27770	.68611
M_FTL4	-.00335	.00880	-.38	.7034	-.02061	.01390
M_TBA4	-.40329	.26440	-1.53	.1272	-.92149	.11492
A_P	2.70340***	.30924	8.74	.0000	2.09729	3.30950
P_NC05	2.98484***	.16927	17.63	.0000	2.65307	3.31660
P_NC15	.81959***	.17354	4.72	.0000	.47946	1.15971
P_NC25	.53814***	.16603	3.24	.0012	.21272	.86355
P_NC35	.12334	.20635	.60	.5500	-.28110	.52777
P_SX5	.35864***	.06698	5.35	.0000	.22736	.48992
P_ID25	1.56899***	.19012	8.25	.0000	1.19636	1.94163
P_ID35	1.54176***	.19763	7.80	.0000	1.15442	1.92910
P_ID45	1.60037***	.19130	8.37	.0000	1.22542	1.97532
P_ID55	1.74355***	.20265	8.60	.0000	1.34636	2.14075

P_IN15	.25243	.22602	1.12	.2640	-.19055	.69542
P_IN25	.44317***	.10494	4.22	.0000	.23750	.64885
P_IN35	.37505***	.10988	3.41	.0006	.15969	.59041
P_LC5	-1.47636***	.08742	-16.89	.0000	-1.64771	-1.30501
P_D25	-2.41827***	.04582	-52.78	.0000	-2.50806	-2.32847
P_NV5	-.16080***	.02063	-7.80	.0000	-.20123	-.12037
P_TR5	.15416	.11430	1.35	.1774	-.06986	.37819
P_RG5	.31278***	.09858	3.17	.0015	.11957	.50599
P_ES5	.06947	.14433	.48	.6303	-.21341	.35236
P_CS5	.49755***	.14586	3.41	.0006	.21167	.78342
P_FTL5	.01605***	.00298	5.39	.0000	.01022	.02189
P_TBA5	-.15504*	.08353	-1.86	.0635	-.31876	.00869

Note: ***, **, * ==> Significance at 1%, 5%, 10% level.