

Parameter Estimates For Models of Selection of Section 15 Programs

Variable	Full Model	Limited Explanatory Variables	Limited Covariance Structure
Trips			
Constant	-1.228** (0.029)	2.885** (0.029)	-0.311** (0.030)
Time	0.056** (0.004)	0.070** (0.004)	0.064** (0.005)
log (Population)	-0.128** (0.002)		-0.270** (0.003)
log (Population \geq 65)	0.579** (0.003)		0.642** (0.003)
Participation			
Constant	0.176** (0.001)	-0.125** (0.046)	-0.133** (0.001)
Time	0.157** (0.000)	0.178** (0.007)	0.167** (0.001)
log (Population)	-0.456** (0.002)		-0.560** (0.002)
log (Population \geq 65)	0.646** (0.002)		0.684** (0.003)
Covariance Parameters			
Γ_{11}	0.843** (0.002)	0.821** (0.007)	0.895** (0.007)
Γ_{12}	0.033** (0.003)	0.044** (0.004)	
Γ_{21}	-0.096** (0.000)	0.004 (0.019)	
Γ_{22}	0.841** (0.002)	0.829** (0.010)	0.844** (0.004)
$\sqrt{\Omega_{u11}}$	1.234** (0.005)	1.274** (0.029)	1.322** (0.028)
$\Omega_{u12}/\sqrt{\Omega_{u11}\Omega_{u22}}$	-0.053** (0.001)	1.000** (0.067)	
$\sqrt{\Omega_{u22}}$	0.1936** (0.013)	0.175** (0.052)	0.055 (0.067)
$\sqrt{\Omega_{\eta11}}$	0.562** (0.002)	0.559** (0.009)	0.561** (0.002)
$\Omega_{\eta12}/\sqrt{\Omega_{\eta11}}$	0.460** (0.001)	0.275** (0.013)	
log Likelihood	-3077.02	-3093.36	-3107.56

Notes:

1. Numbers in parentheses are asymptotic standard errors.
2. Double starred items are significant at the 5% level.
3. The standard formula for the standard error of $\Omega_{u12}/\sqrt{\Omega_{u11}\Omega_{u22}}$ does not apply in the second column because

$$\alpha = \frac{\Omega_{u12}}{\sqrt{\Omega_{u11}\Omega_{u22}}} = \frac{c_{11}c_{21}}{|c_{11}|\sqrt{c_{21}^2 + c_{22}^2}}$$

with derivative

$$\frac{\partial \alpha}{\partial c_{22}} = 0$$

when $c_{22} = 0$ where c_{ij} are the Choleski terms associated with Ω_u . The first order Taylor series approximation uses $\frac{\partial \alpha}{\partial c_{22}} (\hat{c}_{22} - plim\hat{c}_{22})$. If $\frac{\partial \alpha}{\partial c_{22}} = 0$, then this term disappears, and the dominant term involves a fourth order moment of \hat{c}_{22} . Instead we simulate $Var\hat{\alpha}$. Note that $\max\hat{\alpha} = 1$, so $\hat{\alpha}$ is biased downwards when $\alpha = 1$. In this case, the simulated bias is -0.047 .

4. $\Omega_{\eta 22}$ is not identified as is the case in any binary discrete choice problem. It is set to unity.

CTS Data Moments

Variable	Active			Lapsed		
	# Obs	Mean	Std. Dev.	#Obs	Mean	Std. Dev.
TTRIPS	2133	74.55	167.03	3908	0.00	0.00
CVILLE	2095	0.55	0.50	3843	0.63	0.48
AGE	1962	70.38	20.53	3412	75.06	18.41
YEARS	2018	1.5	3.21	3908	3.14	4.53
MALE	2109	0.33	0.47	3854	0.35	0.48
FEMALE	2109	0.65	0.48	3854	0.63	0.48
NONAM- BULATORY	2133	0.19	0.39	3908	0.31	0.46
MOBILITY AID ARTHRITIS, AMPUTATION, INCOORDINATION	2133	0.26	0.44	3908	0.30	0.46
CEREBRO- VASCULAR	2133	0.19	0.39	3908	0.25	0.43
PULMONARY	2133	0.09	0.29	3908	0.10	0.30
KIDNEY	2133	0.03	0.17	3908	0.04	0.20
SIGHT	2133	0.14	0.34	3908	0.12	0.33
MENTAL RETARDATION	2133	0.07	0.25	3908	0.04	0.20
NEUROLOGICAL PROBLEM	2133	0.07	0.26	3908	0.09	0.28
OTHER PROBLEM	2133	0.27	0.44	3908	0.30	0.46
PERMANENT PROBLEM	2111	0.91	0.29	3896	0.96	0.21
NEEDS ATTENDENT	2133	0.16	0.45	3908	0.96	0.21

Distribution of Issue Dates

Year	Active	Lapsed	Total
1984	6	15	21
1985	34	45	79
1986	33	91	124
1987	68	212	280
1988	75	235	310
1989	77	544	621
1990	103	452	555
1991	136	472	608
1992	197	510	707
1993	227	498	725
1994	319	332	651
1995	473	276	749
1996	270	226	496

Note: The 1996 data is for only the first 10 months of the year.

Sample Moments for the MCBS

Variable	Mean	Std. Dev.	Variable	Mean	Std. Dev.
METRO	0.723	0.447	MOBILITY AID	0.185	0.388
N ENGL	0.032	0.176	ARTHRITIS, AMPUTATION, INCOORDINATION	0.586	0.493
M ATLN	0.177	0.382	CEREBRO- VASCULAR	0.683	0.465
ENC	0.170	0.375	PULMONARY	0.141	0.348
WNC	0.066	0.248	KIDNEY	0.156	0.363
S ATLN	0.208	0.406	SIGHT(little)	0.326	0.469
ESC	0.060	0.238	SIGHT(lot)	0.117	0.321
WSC	0.104	0.305	MENTAL RETARDATION	0.041	0.199
MOUNT	0.058	0.233	NEUROLOGICAL PROBLEM	0.020	0.139
PACF	0.125	0.331	OTHER PROBLEM	0.435	0.496
AGE/100	0.706	0.146	NURSING HOME	0.090	0.286
FEMALE	0.564	0.496	DIED	0.050	0.218
NONAM- BULATORY	0.225	0.418			

Note: Most variables are defined in Table 3. The rest are self-explanatory U.S. region dummies.

Parameter Estimates for Death Probabilities

Variable		Variable	
CONSTANT	-5.189** (0.969)	MOUNT	0.661* (0.328)
METRO	0.249* (0.108)	PACF	0.461 (0.305)
N ENGL	0.00	AGE/100	-1.054 (2.620)
M ATLN	0.372 (0.299)	(AGE/100) ²	3.937* (1.852)
ENC	0.317 (0.299)	FEMALE	-0.713** (0.094)
WNC	0.211 (0.333)	NONAM- BULATORY	0.745** (0.114)
S ATLN	0.610* (0.293)	MOBILITY AID	0.416** (0.110)
ESC	0.505 (0.330)	ARTHRITIS, AMPUTATION, INCOORDINATION	-0.526** (0.095)
WSC	0.440 (0.310)	CEREBRO- VASCULAR	-0.122 (0.107)

Parameter Estimates for Death Probabilities (continued)

Variable		Variable	
PULMONARY	0.326** (0.117)	MENTAL RETARDATION	-0.420 (0.396)
KIDNEY	0.314** (0.113)	NEUROLOGICAL PROBLEM	0.279 (0.224)
SIGHT (little)	0.228* (0.103)	OTHER PROBLEM	0.268** (0.092)
SIGHT (lot)	0.565** (0.125)	NURSING HOME	0.715** (0.121)

Notes:

1. Numbers in parentheses are standard errors.
2. Single-starred items are significant at the 5% level, and double starred items are significant at the 1% level.

**Parameter Estimates for Trip Demand
Poisson and Negbin Random Effects Models (Active Users)**

Variable	Poisson	Negbin	Variable	Poisson	Negbin
CONSTANT	1.728** (0.227)	-1.980** (0.099)	OTHER PROBLEM	-0.268** (0.082)	-0.195** (0.034)
CVILLE	0.045 (0.071)	0.211** (0.029)	PERMANENT PROBLEM	0.229 (0.171)	0.518** (0.073)
AGE/10	-0.163** (0.021)	0.001 (0.008)	NEEDS ATTENDENT	-0.198* (0.092)	-0.357** (0.041)
FEMALE	0.198** (0.077)	0.392** (0.031)	NURSING HOME	-0.100** (0.015)	-0.078** (0.006)
NONAM- BULATORY	-0.229* (0.095)	-0.407** (0.042)	NOV94	0.000	0.000
MOBILITY AID	-0.256** (0.076)	-0.189** (0.033)	DEC94	-0.084** (0.021)	-0.016 (0.061)
ARTHRITIS, AMPUTATION, INCOORDINATION	-0.056 (0.079)	0.105** (0.034)	JAN95	-0.037 (0.020)	-0.035 (0.062)
CEREBRO- VASCULAR	0.024 (0.084)	-0.011 (0.038)	FEB95	-0.025 (0.033)	0.006 (0.061)
PULMONARY	-0.099 (0.112)	-0.070 (0.048)	MAR95	0.179** (0.019)	0.180** (0.060)
KIDNEY	0.156 (0.190)	-0.684* (0.072)	APR95	-0.021 (0.020)	0.066 (0.061)
SIGHT	0.485** (0.099)	0.448** (0.039)	MAY95	0.100** (0.020)	0.084 (0.061)
MENTAL RETARDATION	0.669** (0.144)	-0.023 (0.050)	JUN95	0.022 (0.020)	0.125* (0.060)
NEUROLOGICAL PROBLEM	0.443** (0.125)	0.408* (0.048)	JUL95	0.046* (0.020)	0.140* (0.060)

Poisson and Negbin Random Effects Models (Continued)

Variable	Poisson	Negbin	Variable	Poisson	Negbin
AUG95	0.129** (0.019)	0.158** (0.060)	MAY96	0.073** (0.020)	0.109 (0.060)
SEP95	-0.089** (0.021)	0.095 (0.060)	JUN96	-0.039 (0.020)	0.005 (0.061)
OCT95	-0.043* (0.020)	0.079 (0.060)	JUL96	0.196** (0.019)	0.194** (0.059)
NOV95	0.103** (0.020)	0.182* (0.059)	AUG96	0.146** (0.020)	0.099 (0.060)
DEC95	-0.082** (0.021)	0.095 (0.065)	SEP96	0.154** (0.020)	0.106 (0.060)
JAN96	0.088** (0.020)	0.091 (0.060)	OCT96	0.371** (0.019)	0.241** (0.059)
FEB96	0.040* (0.020)	0.135* (0.060)	$\log(\alpha) / \alpha_1$	-0.639** (0.028)	0.931** (0.030)
MAR96	0.006 (0.020)	0.136* (0.061)	α_2		1.802** (0.074)
APR96	0.192** (0.019)	0.209** (0.059)	Log-lik.	-96990	-60002

Notes:

1. Double starred items are statistically significant at the 1% level, and single starred items are statistically significant at the 5% level.
2. NOV94 through OCT96 are calendar time dummy variables. NOV94 is the excluded case.

**Parameter Estimates for Trip Demand
Population-Averaged Panel Data Models Using GEE Based on
Poisson and
Negbin Family Serial Correlation (Active Users)**

Variable	Poisson Family	Negbin Family	Variable	Poisson Family	Negbin Family
CONSTANT	1.507** (0.259)	1.761** (0.251)	OTHER PROBLEM	-0.143 (0.113)	-0.208 (0.109)
CVILLE	0.183 (0.095)	0.071 (0.094)	PERMANENT PROBLEM	0.304 (0.203)	0.187 (0.194)
AGE/10	-0.135** (0.024)	-0.163** (0.023)	NEEDS ATTENDENT	-0.276 (0.162)	-0.229 (0.151)
FEMALE	0.104 (0.108)	0.206 (0.112)	NURSING HOME	-0.142** (0.030)	-0.107** (0.029)
NONAM- BULATORY	-0.023 (0.152)	-0.202 (0.149)	NOV94	0.000	0.000
MOBILITY AID	-0.110 (0.115)	-0.203 (0.111)	DEC94	-0.085** (0.029)	-0.048 (0.034)
ARTHRITIS, AMPUTATION, INCOORDINATION	-0.234* (0.111)	-0.108 (0.105)	JAN95	-0.037 (0.035)	-0.040 (0.041)
CEREBRO- VASCULAR	0.017 (0.138)	-0.006 (0.131)	FEB95	-0.025 (0.040)	-0.017 (0.044)
PULMONARY	-0.414 (0.320)	-0.222 (0.245)	MAR95	0.179** (0.041)	0.216** (0.047)
KIDNEY	0.354 (0.232)	0.173 (0.190)	APR95	-0.021 (0.044)	-0.006 (0.049)
SIGHT	0.479** (0.118)	0.487** (0.119)	MAY95	0.100* (0.049)	0.099 (0.054)
MENTAL RETARDATION	0.698** (0.158)	0.687** (0.150)	JUN95	0.022 (0.051)	0.054 (0.059)
NEUROLOGICAL PROBLEM	0.379* (0.150)	0.431** (0.145)	JUL95	0.046 (0.056)	0.054 (0.064)

Population-Averaged Panel Data Models Using GEE (continued)

Variable	Poisson Family	Negbin Family	Variable	Poisson Family	Negbin Family
AUG95	0.130* (0.056)	0.158* (0.063)	MAY96	0.073 (0.068)	0.036 (0.074)
SEP95	-0.089 (0.062)	-0.057 (0.071)	JUN96	-0.039 (0.068)	-0.078 (0.075)
OCT95	-0.043 (0.064)	-0.009 (0.071)	JUL96	0.196** (0.067)	0.130 (0.074)
NOV95	0.103 (0.057)	0.118 (0.066)	AUG96	0.146* (0.067)	0.111 (0.075)
DEC95	-0.082 (0.058)	-0.066 (0.065)	SEP96	0.154* (0.067)	0.116 (0.075)
JAN96	0.088 (0.059)	0.046 (0.066)	OCT96	0.371** (0.068)	0.314** (0.076)
FEB96	0.040 (0.059)	0.003 (0.066)	Dispersion ϕ	8.637	2.410
MAR96	0.006 (0.061)	-0.029 (0.067)	ρ	0.838	0.827
APR96	0.192** (0.062)	0.162* (0.069)			

Notes:

1. Starred items are statistically significant at the 5% level (*) or 1% level (**).
2. Standard errors are in parentheses and are adjusted of clustering on cross sectional units.
3. NOV94 through OCT96 are calendar time dummy variables. NOV94 is the excluded case.

**Parameter Estimates for Trip Demand
Generalized Model (Estimated Death Parameters)**

Variable	Estimate	Variable	Estimate
CONSTANT	2.2528** (0.003)	PERMANENT PROBLEM	-0.369** (0.002)
CVILLE	-0.397** (0.001)	NEEDS ATTENDENT	-0.120** (0.001)
AGE/100	-1.550** (0.002)	FEMALE	-0.160** (0.001)
NONAM- BULATORY	-0.447** (0.001)	NURSING HOME	-0.633** (0.001)
MOBILITY AID	0.338** (0.001)	NOV94	0.00
ARTHRITIS, AMPUTATION, INCOORDINATION	-0.198** (0.001)	DEC94	0.030** (0.009)
CEREBRO- VASCULAR	0.039** (0.001)	JAN95	0.038** (0.011)
PULMONARY	-0.261** (0.001)	FEB95	0.050** (0.012)
KIDNEY	-0.956** (0.002)	MAR95	0.251** (0.010)
SIGHT	0.481** (0.001)	APR95	0.036** (0.012)
MENTAL RETARDATION	0.510** (0.001)	MAY95	0.171** (0.010)
NEUROLOGICAL PROBLEM	-0.301** (0.001)	JUN95	0.060** (0.009)
OTHER PROBLEM	-0.338** (0.001)	JUL95	0.075** (0.008)

**Parameter Estimates for Trip Demand
Generalized Model (Estimated Death Parameters) (continued)**

Variable	Estimate	Variable	Estimate
AUG95	0.153** (0.008)	JUL96	0.122** (0.008)
SEP95	-0.071** (0.010)	AUG96	0.078** (0.009)
OCT95	-0.040** (0.009)	SEP96	0.069** (0.009)
NOV95	0.101** (0.010)	OCT96	0.289** (0.006)
DEC95	-0.083** (0.011)	ρ	0.961** (0.000)
JAN96	0.077** (0.010)	σ_F	1.486** (0.000)
FEB96	0.004 (0.010)	σ_G	0.208** (0.000)
MAR96	-0.053** (0.010)	σ_K	0.783** (0.001)
APR96	0.133** (0.009)	LogLik	-121555.5
MAY96	0.006 (0.008)	Avg. Death Probability	0.00124
JUN96	-0.116** (0.009)		

Notes:

1. Double-starred items are statistically significant at the 1% level, and single-starred items are statistically significant at the 5% level.
2. NOV94 through OCT96 are calendar time dummy variables. NOV94 is the excluded case.

**Parameter Estimates for Trip Demand
Generalized Model (Fixed Death Parameters)**

Variable	Estimate	BHHH	Parametric Bootstrap		Significant 90% Confidence Interval
		Std Err	Std Err	Median Bias	
CONSTANT	2.293**	0.008	0.291	-0.784	Yes
CVILLE	-0.371**	0.001	0.152	-0.266	Yes
AGE/100	-1.547**	0.002	0.309	-0.583	Yes
NONAM- BULATORY	-0.427*	0.001	0.227	-0.135	No
MOBILITY AID	0.340*	0.001	0.193	0.083	No
ARTHRITIS, AMPUTATION, INCOORDINATION	-0.183	0.001	0.224	-0.121	No
CEREBRO- VASCULAR	-0.002	0.001	0.185	-0.169	No
PULMONARY	-0.272	0.001	0.215	-0.091	Yes
KIDNEY	-0.917**	0.002	0.376	0.024	Yes
SIGHT	0.505**	0.001	0.205	0.147	Yes
MENTAL RETARDATION	0.511**	0.001	0.255	0.293	Yes
NEUROLOGICAL PROBLEM	-0.295	0.001	0.233	-0.098	No

**Parameter Estimates for Trip Demand
Generalized Model (Fixed Death Parameters) (continued)**

Variable	Estimate	BHHH	Parametric Bootstrap		Significant 90% Confidence Interval
		Std Err	Std Err	Median Bias	
OTHER PROBLEM	-0.327*	0.001	0.180	-0.164	Yes
PERMANENT PROBLEM	-0.356*	0.002	0.224	-0.517	No
NEEDS ATTENDENT	-0.087	0.001	0.231	-0.040	No
FEMALE NURSING	-0.151	0.001	0.169	-0.154	No
HOME	-0.558**	0.001	0.167	-0.316	Yes
NOV94	0.00				
DEC94	-0.070	0.017	0.164	0.081	No
JAN95	-0.059	0.014	0.150	0.035	No
FEB95	-0.048	0.014	0.122	0.106	No
MAR95	0.149	0.013	0.098	0.114	No
APR95	-0.062	0.014	0.103	0.038	No
MAY95	0.078	0.012	0.097	0.076	No

**Parameter Estimates for Trip Demand
Generalized Model (Fixed Death Parameters)(continued)**

Variable	Estimate	BHHH	Parametric Bootstrap		Significant 90% Confidence Interval
		Std Err	Std Err	Median Bias	
JUN95	-0.036	0.012	0.127	0.092	No
JUL95	-0.014	0.011	0.116	0.059	No
AUG95	0.071	0.011	0.131	0.098	No
SEP95	-0.150	0.013	0.114	0.081	No
OCT95	-0.115	0.012	0.096	0.049	No
NOV95	0.026	0.013	0.104	0.091	No
DEC95	-0.163	0.013	0.129	0.024	No
JAN96	-0.004	0.013	0.131	0.093	No
FEB96	-0.061	0.012	0.113	0.068	No
MAR96	-0.116	0.013	0.115	0.080	No
APR96	0.075	0.012	0.115	0.073	No
MAY96	-0.051	0.011	0.108	0.062	No

**Parameter Estimates for Trip Demand
Generalized Model (Fixed Death Parameters)(continued)**

Variable	Estimate	BHHH	Parametric Bootstrap		Significant 90% Confidence Interval
		Std Err	Std Err	Median Bias	
JUN96	-0.172*	0.012	0.098	0.056	Yes
JUL96	0.073	0.011	0.107	0.077	No
AUG96	0.039	0.012	0.093	0.081	No
SEP96	0.038	0.012	0.106	0.091	No
OCT96	0.279**	0.009	0.103	0.134	Yes
ρ	0.961**	0.000	0.013	-0.005	Yes
σ_F	1.478**	0.000	0.034	0.139	Yes
σ_G	0.208**	0.000	0.038	0.024	Yes
σ_K	0.776**	0.001	0.130	0.127	Yes
LogLik		-144860.8			
Avg. Death Probability		0.06877			

Notes:

1. NOV94 through OCT96 are calendar time dummy variables. NOV94 is the excluded case.
2. BHHH standard errors are based on the outer product of first derivatives of the log likelihood.
3. Parametric bootstrap standard errors the standard deviation of estimates of the parameters based on estimating the model 50 times with independent draws of the data simulated using the estimated parameters.
4. The median bias is the parameter estimate minus the median estimate from the parametric bootstrap procedure.
5. "Significant 90% Confidence Interval" is Yes iff the 5% median bias-adjusted order statistic and the 95% median bias-adjusted order statistic of the parametric bootstrap estimators are on the same side of zero.
6. Double-starred items have t-statistics (using the parametric bootstrap estimate of the standard error) with absolute value greater than 1.96, and single starred items have t-statistics with absolute value between 1.53 and 1.96.