



(R)

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Notes:

1. Unicode is supported; see [help unicode advice](#).

```

1 . doedit "C:\
2 . do "C:\
3 . *Import dataset.*
4 .
5 . import delimited "C:\
   (21 vars, 1,326 obs)
6 .
7 . *Assign labels to each variable in the dataset.*
8 .
9 . label variable alpha3 "Alpha-3 Code"
10 . label variable q5coverage "MCV1 Coverage in the Wealthiest Quintile"
11 . label variable q1coverage "MCV1 Coverage in the Poorest Quintile"
12 . label variable geoequity "Geographic Equity"
13 . label variable dtp3 "DTP3 Coverage"
14 . label variable mcv1 "MCV1 Coverage"
15 . label variable anc1 "Antenatal Care Coverage (1+ Visits)"
16 . label variable pab "Protection at Birth Against Neonatal Tetanus"
17 . label variable femeduc "Female Primary Education Completed"
18 . label variable polstability "Political Stability"
19 . label variable goveffect "Government Effectiveness"

```

```

20 . label variable corrupt "Corruption"
21 . label variable gii "Gender Inequality Index"
22 . label variable oopexp "Out-of-Pocket Health Expenditures"
23 . label variable govexp "Domestic Government Health Expenditures"
24 . label variable exthlth "External Health Spending"
25 . label variable land "Land Area"
26 . label variable lingfrac "Linguistic Fractionalization"
27 . label variable distance "Distance to Nearest Health Facility (Walking, 60+ Minutes)"
28 .
29 . *****
30 . ***Creating new variables for socioeconomic vaccine equity & integrated vaccine delivery.***
31 . *****
32 .
33 . *Create and label a new variable, "ceqr," representing the ratio of MCV1 coverage in the wealth
34 .
35 . generate ceqr = q5coverage/q1coverage
    (1,113 missing values generated)
36 . label variable ceqr "Socioeconomic Equity"
37 .
38 . *Create and label a new variable, integration, representing integrated vaccine delivery.*
39 .
40 . generate integration = 0
41 . label variable integration "Integrated Vaccine Delivery"
42 .
43 . *Create new variables representing all possible absolute differences between MCV1, DTP3, ANC1,
44 .
45 . generate abs_mcv1dtp3 = abs(mcv1-dtp3)
    (10 missing values generated)
46 . generate abs_mcv1anc1 = abs(mcv1-anc1)
    (1,009 missing values generated)
47 . generate abs_mcv1pab = abs(mcv1-pab)
    (233 missing values generated)
48 . generate abs_dtp3anc1 = abs(dtp3-anc1)
    (1,010 missing values generated)
49 . generate abs_dtp3pab = abs(dtp3-pab)
    (234 missing values generated)

```

```

50 . generate abs_anc1pab = abs(anc1-pab)
    (1,072 missing values generated)

51 .
52 . *Set "integration" to 0 if MCV1, DTP3, ANC1, and PAB all fall below 70%.*
53 .
54 . replace integration=0 if mcv1<70 & dtp3<70 & anc1<70 & pab<70
    (0 real changes made)

55 .
56 . *Set "integration" to 1 if coverage of at least one of the four services is greater than or equal to
57 .
58 . replace integration=1 if mcv1>=70 | dtp3>=70 | anc1>=70 | pab>=70
    (1,304 real changes made)

59 .
60 . *Set "integration" to 2 if co-coverage levels of at least two of the four services are greater than or equal to
    > percentage points of one another.*
61 .
62 . replace integration=2 if mcv1>=70 & dtp3>=70 & abs_mcv1dtp3<=10 | mcv1>=70 & anc1>=70 & abs_mcv1anc1<=10 |
    > mcv1pab<=10 | dtp3>=70 & anc1>=70 & abs_dtp3anc1<=10 | dtp3>=70 & pab>=70 & abs_dtp3pab<=10 | a
    (1,006 real changes made)

63 .
64 . *Set "integration" to 3 if co-coverage levels of at least three of the four services are greater than or equal to
    > percentage points of one another.*
65 .
66 . replace integration=3 if mcv1>=70 & dtp3>=70 & anc1>=70 & abs_mcv1dtp3<=10 & abs_mcv1anc1<=10 & abs_mcv1pab<=10 |
    > 70 & pab>=70 & abs_mcv1dtp3<=10 & abs_mcv1pab<=10 & abs_dtp3pab<=10 | mcv1>=70 & anc1>=70 & pab>=70 & abs_anc1pab<=10 |
    > <=10 & abs_anc1pab<=10 | dtp3>=70 & anc1>=70 & pab>=70 & abs_dtp3anc1<=10 & abs_dtp3pab<=10 & a
    (585 real changes made)

67 .
68 . *Set "integration" to 4 if co-coverage levels of all four services are greater than or equal to
    > of one another.*
69 .
70 . replace integration=4 if mcv1>=70 & dtp3>=70 & anc1>=70 & pab>=70 & abs_mcv1dtp3<=10 & abs_mcv1anc1<=10 & abs_mcv1pab<=10 &
    > anc1<=10 & abs_dtp3pab<=10 & abs_anc1pab<=10
    (63 real changes made)

71 .
72 . *Create a table summarizing all values of "integration."
73 .
74 . tabulate integration

```

Integrated Vaccine Delivery	Freq.	Percent	Cum.
0	22	1.66	1.66
1	298	22.47	24.13
2	421	31.75	55.88
3	522	39.37	95.25
4	63	4.75	100.00
Total	1,326	100.00	

```

75 .
76 . *Create a new variable ("year_dup") that duplicates the "Year" column of the dataset.*
77 .
78 . generate year_dup = year

79 .
    end of do-file

80 . do "C:\Users\sjrav\AppData\Local\Temp\STD102c_000000.tmp"

81 . ****
> ***
82 . ***Group-based trajectory analysis using socioeconomic equity ("ceqr") as the outcome of interest
> ***
83 . ****
> ***
84 .
85 . *Repeat the trajectory analysis using "ceqr" (socioeconomic vaccine equity) as the outcome of interest
> g variable. Re-import the dataset, create the variable "integration," etc.*
86 .
87 . *Reshape the dataset from long to wide format; wide format is required to run the traj Stata plugin
88 . reshape wide country q5coverage qlcoverage geoequity dtp3 mcv1 anc1 pab femeduc polstability goveffect
> hlth land lingfrac distance ceqr abs_mcvldtp3 abs_mcvlanc1 abs_mcvlpab abs_dtp3anc1 abs_dtp3pab
> alpha3) j(year)
(note: j = 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019)

```

Data	long	->	wide
Number of obs.	1326	->	78
Number of variables	30	->	477
j variable (17 values)	year	->	(dropped)
xij variables:			
country	->		country2003 country2004 ... country2019
q5coverage	->		q5coverage2003 q5coverage2004 ... q5coverage2019
qlcoverage	->		qlcoverage2003 qlcoverage2004 ... qlcoverage2019
geoequity	->		geoequity2003 geoequity2004 ... geoequity2019
dtp3	->		dtp32003 dtp32004 ... dtp32019
mcv1	->		mcv12003 mcv12004 ... mcv12019
anc1	->		anc12003 anc12004 ... anc12019
pab	->		pab2003 pab2004 ... pab2019
femeduc	->		femeduc2003 femeduc2004 ... femeduc2019
polstability	->		polstability2003 polstability2004 ... polstability2019
goveffect	->		goveffect2003 goveffect2004 ... goveffect2019
corrupt	->		corrupt2003 corrupt2004 ... corrupt2019
gii	->		gii2003 gii2004 ... gii2019
oopexp	->		oopexp2003 oopexp2004 ... oopexp2019
govexp	->		govexp2003 govexp2004 ... govexp2019
exthlth	->		exthlth2003 exthlth2004 ... exthlth2019
land	->		land2003 land2004 ... land2019
lingfrac	->		lingfrac2003 lingfrac2004 ... lingfrac2019
distance	->		distance2003 distance2004 ... distance2019
ceqr	->		ceqr2003 ceqr2004 ... ceqr2019
abs_mcvldtp3	->		abs_mcvldtp32003 abs_mcvldtp32004 ... abs_mcvldtp32019
abs_mcvlanc1	->		abs_mcvlanc12003 abs_mcvlanc12004 ... abs_mcvlanc12019
abs_mcvlpab	->		abs_mcvlpab2003 abs_mcvlpab2004 ... abs_mcvlpab2019
abs_dtp3anc1	->		abs_dtp3anc12003 abs_dtp3anc12004 ... abs_dtp3anc12019
abs_dtp3pab	->		abs_dtp3pab2003 abs_dtp3pab2004 ... abs_dtp3pab2019
abs_anc1pab	->		abs_anc1pab2003 abs_anc1pab2004 ... abs_anc1pab2019
integration	->		integration2003 integration2004 ... integration2019
year_dup	->		year_dup2003 year_dup2004 ... year_dup2019

```

89 .
90 . *Run the plugin several times, changing only the number of groups specified ("order") and holdi
> ect the group number that produces the highest BIC value.*
91 .
92 . traj, model(cnorm) var(ceqr*) indep(year_dup*) min(0) max(100) order (0 0)

```

```

==== traj stata plugin ==== Jones BL Nagin DS, build: Mar 17 2021

```

```

78 observations read.
9 had no trajectory data.
69 observations used in the trajectory model.

```

Maximum Likelihood Estimates
Model: Censored Normal (cnorm)

Group	Parameter	Estimate	Standard Error	T for H0: Parameter=0	Prob > T
1	Intercept	1.30917	0.03235	40.474	0.0000
2	Intercept	3.83211	0.15708	24.396	0.0000
	Sigma	0.45353	0.02224	20.396	0.0000
Group membership					
1	(%)	96.70227	2.32377	41.614	0.0000
2	(%)	3.29773	2.32377	1.419	0.1573

```

BIC= -153.72 (N=213) BIC= -151.46 (N=69) AIC= -146.99 ll= -142.99

```

```

Entropy = 0.956

```

```

93 . traj, model(cnorm) var(ceqr*) indep(year_dup*) min(0) max(100) order (0 0 0)

```

```

==== traj stata plugin ==== Jones BL Nagin DS, build: Mar 17 2021

```

```

78 observations read.
9 had no trajectory data.
69 observations used in the trajectory model.

```

Maximum Likelihood Estimates
Model: Censored Normal (cnorm)

Group	Parameter	Estimate	Standard Error	T for H0: Parameter=0	Prob > T
1	Intercept	2.12900	0.11432	18.623	0.0000
2	Intercept	1.23249	0.03045	40.476	0.0000
3	Intercept	4.30515	0.14293	30.122	0.0000
	Sigma	0.37365	0.01903	19.630	0.0000
Group membership					
1	(%)	13.59572	4.78556	2.841	0.0049
2	(%)	84.95492	4.94332	17.186	0.0000
3	(%)	1.44937	1.45602	0.995	0.3207

```

BIC= -136.95 (N=213) BIC= -133.57 (N=69) AIC= -126.87 ll= -120.87

```

```

Entropy = 0.838

```

94 . traj, model(cnorm) var(ceqr*) indep(year_dup*) min(0) max(100) order (0 0 0 0)

==== traj stata plugin ==== Jones BL Nagin DS, build: Mar 17 2021

78 observations read.

9 had no trajectory data.

69 observations used in the trajectory model.

Maximum Likelihood Estimates
Model: Censored Normal (cnorm)

Group	Parameter	Estimate	Standard Error	T for H0: Parameter=0	Prob > T
1	Intercept	1.18527	0.03510	33.765	0.0000
2	Intercept	1.77021	0.08357	21.181	0.0000
3	Intercept	2.76229	0.16775	16.467	0.0000
4	Intercept	4.30517	0.13225	32.554	0.0000
	Sigma	0.34409	0.01893	18.176	0.0000
Group membership					
1	(%)	74.96326	7.26990	10.311	0.0000
2	(%)	19.35628	6.93336	2.792	0.0057
3	(%)	4.23117	2.64867	1.597	0.1116
4	(%)	1.44929	1.46299	0.991	0.3230

BIC= -135.06 (N=213) BIC= -130.55 (N=69) AIC= -121.61 ll= -113.61

Entropy = 0.697

95 . traj, model(cnorm) var(ceqr*) indep(year_dup*) min(0) max(100) order (0 0 0 0 0)

==== traj stata plugin ==== Jones BL Nagin DS, build: Mar 17 2021

78 observations read.

9 had no trajectory data.

69 observations used in the trajectory model.

Maximum Likelihood Estimates
Model: Censored Normal (cnorm)

Group	Parameter	Estimate	Standard Error	T for H0: Parameter=0	Prob > T
1	Intercept	1.18527	0.14576	8.131	0.0000
2	Intercept	1.18527	0.04202	28.210	0.0000
3	Intercept	1.77021	0.08398	21.078	0.0000
4	Intercept	2.76229	0.16857	16.387	0.0000
5	Intercept	4.30517	0.13289	32.396	0.0000
	Sigma	0.34409	0.01902	18.087	0.0000
Group membership					
1	(%)	10.41682	44390.04670	0.000	0.9998
2	(%)	64.54645	44390.04624	0.001	0.9988
3	(%)	19.35627	7.03278	2.752	0.0064
4	(%)	4.23118	2.65508	1.594	0.1125

5 (%) 1.44929 1.47329 0.984 0.3264

BIC= -140.42 (N=213) BIC= -134.78 (N=69) AIC= -123.61 ll= -113.61

Warning: variance matrix is nonsymmetric or highly singular

Entropy = 0.581

96 .
 97 . *The three-group model produced the largest BIC value, so we will move forward with this option
 > or each of the four groups to achieve the largest possible BIC. The model below represents the
 > high entropy, and at least 1% membership in the smallest group.*

98 .
 99 . traj, model (cnorm) var(ceqr*) indep(year_dup*) min(0) max(100) order (0 1 0) tcov(integration*)

==== traj stata plugin ==== Jones BL Nagin DS, build: Mar 17 2021

78 observations read.
 9 had no trajectory data.
 69 observations used in the trajectory model.

Start
 Parameter estimates

0.72526,	0.00000,	1.43083,	0.00000,	0.00000,	2.13641,
0.00000,	0.70558,	33.33333,	33.33333,	33.33333	

	Neg. Log Likelihood	Percent Decrease
0	226.9413254	
1	224.3433006	1.14480022
2	224.3177128	0.01140565
3	207.7389386	7.39075572
4	194.2147038	6.51020695
5	186.1502213	4.15235425
6	178.6386724	4.03520817
7	167.9231464	5.99843571
8	155.1998833	7.57683706
9	148.3032601	4.44370380
10	136.1171482	8.21702229
11	125.2100619	8.01301408
12	118.1043889	5.67500163
13	111.9428180	5.21705496
14	105.7993263	5.48806240
15	105.7637251	0.03364974
16	105.7408996	0.02158158
17	105.3504941	0.36920962
18	104.2769626	1.01900945
19	104.2096633	0.06453900
20	102.0303433	2.09128397
21	100.9681275	1.04107834
22	100.1857419	0.77488375
23	99.7536249	0.43131584
24	99.7025861	0.05116483
25	99.6902503	0.01237259
26	99.6530081	0.03735796
27	99.6364195	0.01664633
28	99.6312015	0.00523707
29	99.6232328	0.00799820
30	99.6054135	0.01788664
31	99.5487392	0.05689881
32	99.5281619	0.02067058
33	99.2352360	0.29431462
34	98.9393498	0.29816644
35	98.4293229	0.51549449

36	97.7006305	0.74032045
37	97.1191651	0.59515010
38	95.7850648	1.37367358
39	93.8645019	2.00507553
40	92.2022175	1.77094049
41	91.6593050	0.58882796
42	91.5509678	0.11819557
43	91.5284256	0.02462260
44	91.5175272	0.01190712
45	91.5071818	0.01130420
46	91.4683165	0.04247247
47	91.4117697	0.06182114
48	91.3320103	0.08725294
49	91.2829003	0.05377075
50	91.2698152	0.01433468
51	91.2688774	0.00102757
52	91.2688563	0.00002307
53	91.2688561	0.00000024
54	91.2688561	0.00000000

Maximum Likelihood Estimates
Model: Censored Normal (cnorm)

Group	Parameter	Estimate	Standard Error	T for H0: Parameter=0	Prob > T
1	Intercept	2.42788	0.24762	9.805	0.0000
	integration2	-0.22938	0.10530	-2.178	0.0305
2	Intercept	-2.69469	11.49512	-0.234	0.8149
	Linear	0.00219	0.00573	0.382	0.7029
	integration2	-0.16401	0.02965	-5.532	0.0000
3	Intercept	4.15015	0.11149	37.223	0.0000
	integration2	-2.87112	0.35274	-8.140	0.0000
	Sigma	0.32734	0.01736	18.851	0.0000
Group membership					
1	(%)	12.70901	5.64893	2.250	0.0255
2	(%)	84.39238	5.92067	14.254	0.0000
3	(%)	2.89861	2.06379	1.405	0.1616

BIC= -118.08 (N=213) BIC= -112.44 (N=69) AIC= -101.27 ll= -91.27

Parameter estimates for adding risk factors

2.42788,	-0.22938,	-2.69469,	0.00219,	-0.16401,	4.15015,
-2.87112,	0.32734,	1.89317,	-1.47808		

Parameter estimates

2.42788,	-0.22938,	-2.69469,	0.00219,	-0.16401,	4.15015,
-2.87112,	0.32734,	12.70901,	84.39238,	2.89861	

Entropy = 0.703

```

100 .
101 . *Plot the trajectories for the three groups, along with accompanying confidence intervals. Asse
> es an additional diagnostic check for the model (i.e., narrower, non-overlapping CIs are prefer
102 .
103 . trajplot, xtitle("Year") ytitle("Socioeconomic Vaccine Equity Ratio") ci

104 .
105 . *Perform parametric bootstrap sampling to estimate group size confidence intervals.*
106 .
107 . matrix strt = 2.42788, -0.22938, -2.69469, 0.00219, -0.16401, 4.15015, -2.87112, 0.32734, 12.70

108 .
109 . bootstrap _b (100/(1+exp(_b[theta2]))) (100*exp(_b[theta2])/(1+exp(_b[theta2])), reps(1000) do
> indep(year_dup*) min(0) max(110) order(0 1 0) tcov(integration*) start(strt) novar
(running traj on estimation sample)

```

Bootstrap replications (1000)

```

-----|----- 1 -----|----- 2 -----|----- 3 -----|----- 4 -----|----- 5
..... 500
..... 1000

```

```

Bootstrap results                                Number of obs    =          78
                                                Replications      =          993

```

```

command: traj, model(cnorm) var(ceqr*) indep(year_dup*) min(0) max(110) order(0 1 0) tcov
[_eq2]_bs_1: 100/(1+exp(_b[theta2]))
[_eq2]_bs_2: 100*exp(_b[theta2])/(1+exp(_b[theta2]))

```

	Observed Coef.	Bootstrap Std. Err.	z	P> z	Normal-based [95% Conf. Interval]	
_eq1						
interc1	2.427881	.5221046	4.65	0.000	1.404575	3.451188
integration2G1	-.2293803	.2276194	-1.01	0.314	-.6755061	.2167456
interc2	-2.69469	13.86172	-0.19	0.846	-29.86316	24.47378
linear2	.0021874	.0069789	0.31	0.754	-.011491	.0158658
integration2G2	-.1640136	.060712	-2.70	0.007	-.2830071	-.0450202
interc3	4.150147	.5404707	7.68	0.000	3.090844	5.20945
integration2G3	-2.871122	.8074618	-3.56	0.000	-4.453718	-1.288525
sigma	.3273346	.0572921	5.71	0.000	.2150443	.439625
theta2	1.893165	2.35164	0.81	0.421	-2.715964	6.502295
theta3	-1.47808	7.020148	-0.21	0.833	-15.23732	12.28116
_eq2						
_bs_1	13.0884	10.81997	1.21	0.226	-8.118348	34.29515
_bs_2	86.9116	10.81997	8.03	0.000	65.70485	108.1183

Note: One or more parameters could not be estimated in 7 bootstrap replicates;
standard-error estimates include only complete replications.

```

110 .
111 . estat bootstrap, percentile bc

```

```

Bootstrap results                                Number of obs    =          78
                                                Replications      =          993

```

```

command: traj, model(cnorm) var(ceqr*) indep(year_dup*) min(0) max(110) order(0 1 0) tcov
[_eq2]_bs_1: 100/(1+exp(_b[theta2]))
[_eq2]_bs_2: 100*exp(_b[theta2])/(1+exp(_b[theta2]))

```

	Observed Coef.	Bias	Bootstrap Std. Err.	[95% Conf. Interval]		
_eq1						
interc1	2.4278812	-.039195	.52210463	1.346565	3.526153	(P)
				1.677544	3.946244	(BC)
integratio~1	-.22938027	.0071198	.22761941	-.8196257	.3061728	(P)
				-.8791572	.0776538	(BC)
interc2	-2.69469	3.011022	13.861717	-24.99538	25.81442	(P)
				-31.79388	21.38537	(BC)
linear2	.00218743	-.001532	.00697889	-.0122041	.0135169	(P)
				-.0100766	.0167612	(BC)
integratio~2	-.16401364	.0210064	.06071204	-.2310562	-.0006093	(P)
				-.2524408	-.0355059	(BC)
interc3	4.150147	-.1039263	.54047069	3.607574	4.305168	(P)
				3.60757	4.305168	(BC)
integrati~G3	-2.8711215	.3840458	.80746182	-2.960094	-.8588111	(P)
				-17.99372	-2.328633	(BC)
sigma	.32733464	-.0134357	.05729206	.2134433	.43461	(P)
				.2368034	.4737191	(BC)
theta2	1.8931652	.1607706	2.3516399	.3209563	3.80779	(P)
				.6755874	17.51871	(BC)
theta3	-1.4780795	-1.9637	7.0201476	-22.85132	1.177824	(P)
				-22.77366	1.187684	(BC)
_eq2						
_bs_1	13.0884	3.351745	10.819968	2.171516	42.04427	(P)
				2.46e-06	33.72469	(BC)
_bs_2	86.9116	-3.351745	10.819968	57.95573	97.82848	(P)
				66.27531	100	(BC)

(P) percentile confidence interval

(BC) bias-corrected confidence interval

Note: One or more parameters could not be estimated in 7 bootstrap replicates;
standard-error estimates include only complete replications.

```

112 .
113 . *Create a program, "trajstats," to calculate several other diagnostic criteria for group-based
114 .
115 . program trajstats
116 .     1.
117 .     2.
118 .     *This step calculates the average posterior probability.*
119 .     generate Mp=0
120 .     3.
121 .     foreach i of varlist _traj_ProbG* {
122 .         4.         replace Mp = `i' if `i' > Mp
123 .         5.     }
124 .     6.     sort _traj_Group
125 .     7.

```

```

121 . by _traj_Group: generate countG = _N
122 . *This step calculates the odds of correct classification.*
123 .
124 .     by _traj_Group: egen groupAPP = mean(Mp)
125 .     by _traj_Group: generate counter = _n
126 .     generate n = groupAPP/(1 - groupAPP)
127 .     generate p = countG/_N
128 .     generate d = p/(1-p)
129 .     generate occ = n/d
130 .
131 . *This step calculates the estimated group probabilities vs. the proportion of the sample assigned to each group.
132 .
133 .     scalar c = 0
134 .     gen TotProb = 0
135 .     foreach i of varlist _traj_ProbG* {
136 .         scalar c = c + 1
137 .         quietly summarize `i'
138 .         replace TotProb = r(sum)/_N if _traj_Group == c
139 .     }
140 .     gen d_pp = TotProb/(1 - TotProb)
141 .     gen occ_pp = n/d_pp
142 .
143 . *This step displays:
144 .     *Group number [_traj_~p],
145 .     *Count per group (based on the max post prob), [countG]
146 .     *Average posterior probability for each group, [groupAPP]
147 .     *Odds of correct classification (based on the maximum posterior group assignment rule), [occ]
148 .     *Odds of correct classification (based on the weighted posterior probabilities), [occ_pp]
149 .     *Observed probability of groups [p] versus the probability based on the posterior probabilities, [p]
150 .
151 . list _traj_Group countG groupAPP occ occ_pp p TotProb if counter == 1
152 .
153 . restore
154 .
155 . end
156 .
157 .
158 . *Run the trajstats program to perform model diagnostics.*
159 .
160 . trajstats
161 . (77 real changes made)
162 . (67 real changes made)
163 . (2 real changes made)
164 . (9 real changes made)
165 . (67 real changes made)
166 . (2 real changes made)

```

	traj~p	countG	groupAPP	occ	occ_pp	p	TotProb
1.	1	9	.8243302	35.97582	32.22996	.1153846	.1270906
10.	2	67	.958881	3.828603	4.312788	.8589743	.8439231
77.	3	2	.9999985	2.45e+07	2.16e+07	.025641	.0289863

```

143 .
144 . *Create a list of group assignments and group membership probabilities for all subjects.*
145 .
146 . list _traj_Group - _traj_ProbG3

```

	traj~p	_traj_~1	_traj_~2	_traj_~3
1.	2	.0000941	.9999059	1.50e-15
2.	1	.9744619	.0255381	1.37e-37
3.	2	.0004645	.9995355	0
4.	2	.0000512	.9999487	0
5.	2	.0543283	.9456717	1.65e-21
6.	2	.0006904	.9993096	0
7.	2	.085706	.914294	0
8.	2	.0226249	.9773751	0
9.	2	6.89e-06	.9999931	0
10.	2	.0088617	.9911383	0
11.	2	.000541	.999459	0
12.	2	.1270902	.8439237	.0289861
13.	2	.0598217	.9401783	6.40e-20
14.	2	.1270902	.8439237	.0289861
15.	1	.5802357	.4197643	0
16.	1	.7048917	.2951083	0
17.	2	.013982	.986018	0
18.	2	.1654904	.8345096	0
19.	2	.1291536	.8708464	0
20.	2	.1270902	.8439237	.0289861
21.	2	.1270902	.8439237	.0289861
22.	2	.1270902	.8439237	.0289861
23.	2	.0137899	.9862102	6.83e-28
24.	2	.1270902	.8439237	.0289861
25.	2	.0010112	.9989888	0
26.	1	.9872755	.0127245	0
27.	2	.0000412	.9999588	0
28.	2	.0004463	.9995537	0
29.	2	.0156139	.9843861	0
30.	2	.0133901	.9866099	0
31.	2	.0000564	.9999436	5.80e-35
32.	2	.0028184	.9971815	0
33.	1	.6090932	.3909068	0
34.	2	.0264486	.9735515	0
35.	2	.0000938	.9999062	0
36.	2	.0119327	.9880673	0
37.	2	.0422212	.9577788	0
38.	2	.023619	.9763811	0
39.	2	.0125882	.9874118	0
40.	2	.1270902	.8439237	.0289861
41.	2	.0003043	.9996957	0
42.	2	.0077428	.9922572	0
43.	1	.9292977	.0707023	0
44.	2	.0000776	.9999223	0
45.	2	.0130976	.9869024	0
46.	2	.0000261	.9999739	0
47.	2	.0535328	.9464672	0
48.	2	.0286653	.9713347	0

49.	2	.000048	.999952	0
50.	2	.0066991	.9933009	0
51.	3	0	0	1
52.	2	.1270902	.8439237	.0289861
53.	2	.0000101	.9999899	0
54.	1	.9963554	.0036447	0
55.	1	.6760216	.3239784	4.13e-30
56.	2	.0458308	.9541692	0
57.	2	.0000826	.9999174	0
58.	2	.0756492	.9243508	0
59.	2	.0000232	.9999768	0
60.	2	.1270902	.8439237	.0289861
61.	2	6.84e-07	.9999993	0
62.	2	.2006732	.7993268	4.03e-10
63.	1	.9613391	.0386021	.0000589
64.	2	.001035	.998965	0
65.	2	.0224104	.9775897	0
66.	3	3.02e-06	4.32e-13	.999997
67.	2	.0084377	.9915623	0
68.	2	.0000642	.9999357	0
69.	2	.0013049	.9986951	0
70.	2	.108612	.8913881	0
71.	2	.0181121	.9818879	0
72.	2	.0000392	.9999608	0
73.	2	.0050644	.9949356	3.11e-16
74.	2	.014767	.9852329	0
75.	2	.0313622	.9686378	0
76.	2	2.71e-06	.9999973	0
77.	2	.0007021	.9992979	0
78.	2	.0000181	.9999819	0

```
147 .
    end of do-file
```

```
148 . graph export "C:\Users\sjrav\Desktop\Disseration\Aim 3 - Quantitative Analysis\Data\STATA Outp
> - trajplot.png", as(png) replace
could not find Graph window
r(693);
```

```
149 . do "C:\Users\sjrav\AppData\Local\Temp\STD102c_000000.tmp"
```

```
150 . reshape long
    (note: j = 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019)
```

Data	wide	->	long
------	------	----	------

Number of obs.	78	->	1326
Number of variables	481	->	34
j variable (17 values)		->	year
xij variables:			
country2003 country2004 ... country2019		->	country
q5coverage2003 q5coverage2004 ... q5coverage2019		->	q5coverage
q1coverage2003 q1coverage2004 ... q1coverage2019		->	q1coverage
geoequity2003 geoequity2004 ... geoequity2019		->	geoequity
dtp32003 dtp32004 ... dtp32019		->	dtp3
mcv12003 mcv12004 ... mcv12019		->	mcv1
anc12003 anc12004 ... anc12019		->	anc1
pab2003 pab2004 ... pab2019		->	pab

```

femeduc2003 femeduc2004 ... femeduc2019 -> femeduc
polstability2003 polstability2004 ... polstability2019->polstability
goveffect2003 goveffect2004 ... goveffect2019->goveffect
corrupt2003 corrupt2004 ... corrupt2019 -> corrupt
    gii2003 gii2004 ... gii2019 -> gii
    oopexp2003 oopexp2004 ... oopexp2019 -> oopexp
    govexp2003 govexp2004 ... govexp2019 -> govexp
exthlth2003 exthlth2004 ... exthlth2019 -> exthlth
    land2003 land2004 ... land2019 -> land
lingfrac2003 lingfrac2004 ... lingfrac2019-> lingfrac
distance2003 distance2004 ... distance2019-> distance
    ceqr2003 ceqr2004 ... ceqr2019 -> ceqr
abs_mcv1dtp32003 abs_mcv1dtp32004 ... abs_mcv1dtp32019->abs_mcv1dtp3
abs_mcv1anc12003 abs_mcv1anc12004 ... abs_mcv1anc12019->abs_mcv1anc1
abs_mcv1pab2003 abs_mcv1pab2004 ... abs_mcv1pab2019->abs_mcv1pab
abs_dtp3anc12003 abs_dtp3anc12004 ... abs_dtp3anc12019->abs_dtp3anc1
abs_dtp3pab2003 abs_dtp3pab2004 ... abs_dtp3pab2019->abs_dtp3pab
abs_anc1pab2003 abs_anc1pab2004 ... abs_anc1pab2019->abs_anc1pab
integration2003 integration2004 ... integration2019->integration
year_dup2003 year_dup2004 ... year_dup2019-> year_dup

```

```

151 .
152 . *Perform multinomial logistic regression to identify covariates with statistically significant
    > etting Group 1 membership as the base outcome.*
153 .
154 . mlogit _traj_Group femeduc polstability goveffect corrupt gii oopexp govexp exthlth land lingfrac
    > 1)

```

```

Iteration 0: log likelihood = -179.04955
Iteration 1: log likelihood = -160.32314
Iteration 2: log likelihood = -129.23603
Iteration 3: log likelihood = -110.34248
Iteration 4: log likelihood = -95.788705
Iteration 5: log likelihood = -90.755274
Iteration 6: log likelihood = -89.352092
Iteration 7: log likelihood = -88.885284
Iteration 8: log likelihood = -88.789346
Iteration 9: log likelihood = -88.766746
Iteration 10: log likelihood = -88.761253
Iteration 11: log likelihood = -88.760128
Iteration 12: log likelihood = -88.75992
Iteration 13: log likelihood = -88.759899
Iteration 14: log likelihood = -88.759894

```

```

Multinomial logistic regression      Number of obs      =      346
                                      LR chi2(24)           =      180.58
                                      Prob > chi2           =      0.0000
Log likelihood = -88.759894          Pseudo R2           =      0.5043

```

_traj_Group	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
1	(base outcome)					
2						
femeduc	.0244232	.0152222	1.60	0.109	-.0054117	.0542581
polstability	.0423123	.333347	0.13	0.899	-.6110357	.6956603
goveffect	-1.828646	.8749003	-2.09	0.037	-3.543419	-.1138726
corrupt	.5421276	.8823969	0.61	0.539	-1.187339	2.271594
gii	-1.764196	1.095428	-1.61	0.107	-3.911195	.3828027
oopexp	-.0102206	.0141131	-0.72	0.469	-.0378818	.0174405
govexp	.019156	.0061616	3.11	0.002	.0070796	.0312324
exthlth	.0589978	.0244449	2.41	0.016	.0110866	.1069089
land	-6.60e-07	3.46e-07	-1.91	0.056	-1.34e-06	1.69e-08

lingfrac	2.001122	.9702362	2.06	0.039	.0994942	3.90275
distance	.0140563	.01335	1.05	0.292	-.0121093	.040222
integration	.7673035	.2582852	2.97	0.003	.2610737	1.273533
_cons	-4.958165	1.713945	-2.89	0.004	-8.317436	-1.598894
3						
femeduc	-.8416916	327.2962	-0.00	0.998	-642.3305	640.6471
polstability	21.78257	7202.625	0.00	0.998	-14095.1	14138.67
goveffect	-6.558478	18000.4	-0.00	1.000	-35286.69	35273.58
corrupt	-49.70104	22753.52	-0.00	0.998	-44645.77	44546.37
gii	-63.39735	14768.16	-0.00	0.997	-29008.46	28881.66
oopexp	1.760913	262.9148	0.01	0.995	-513.5426	517.0644
govexp	.0745374	16.70213	0.00	0.996	-32.66104	32.81012
exthlth	.398066	530.8453	0.00	0.999	-1040.04	1040.836
land	.0000502	.0086052	0.01	0.995	-.0168158	.0169161
lingfrac	-100.0659	32307.89	-0.00	0.998	-63422.37	63222.24
distance	-1.558608	253.3983	-0.01	0.995	-498.2101	495.0929
integration	-31.34055	6971.836	-0.00	0.996	-13695.89	13633.21
_cons	45.05146	36315.43	0.00	0.999	-71131.89	71221.99

Note: 21 observations completely determined. Standard errors questionable.

155 .
end of do-file

156 .