**. glm dv `ss\_lag\_1\_vars' `covariates' ib(freq).state ib(freq).time, family(poisson) link(log) vce(cl mineid) exposure(hours) iter(50) eform**

Iteration 0: log pseudolikelihood = -9585.7537

Iteration 1: log pseudolikelihood = -8983.3591

Iteration 2: log pseudolikelihood = -8979.8728

Iteration 3: log pseudolikelihood = -8979.8704

Iteration 4: log pseudolikelihood = -8979.8704

Generalized linear models No. of obs = 6,253

Optimization : ML Residual df = 6,217

Scale parameter = 1

Deviance = 8384.875071 (1/df) Deviance = 1.348701

Pearson = 9307.93187 (1/df) Pearson = 1.497174

Variance function: V(u) = u [Poisson]

Link function : g(u) = ln(u) [Log]

AIC = 2.883694

Log pseudolikelihood = -8979.870382 BIC = -45956.78

(Std. Err. adjusted for 1,238 clusters in mineid)

-----------------------------------------------------------------------------------

| Robust

dv | IRR Std. Err. z P>|z| [95% Conf. Interval]

------------------+----------------------------------------------------------------

p47\_ss\_1lag | .859632 .1662631 -0.78 0.434 .5884101 1.255871

p48\_ss\_1lag | .9932874 .0219104 -0.31 0.760 .9512589 1.037173

p71\_ss\_1lag | .7311333 .0949015 -2.41 0.016 .5669049 .9429376

p72\_ss\_1lag | .9919961 .0697941 -0.11 0.909 .8642149 1.138671

p75\_ss\_1lag | 1.002465 .0008536 2.89 0.004 1.000793 1.004139

p77\_ss\_1lag | 1.016598 .0183757 0.91 0.362 .9812125 1.053259

mine\_time | .9931678 .0091416 -0.74 0.456 .9754112 1.011248

onsite\_insp\_hours | .9998869 .0000531 -2.13 0.033 .9997827 .999991

|

state |

1 | 1.09771 .0870889 1.18 0.240 .9396278 1.282387

2 | 2.048167 .1414915 10.38 0.000 1.788804 2.345137

3 | .7445265 .1187134 -1.85 0.064 .5447004 1.01766

4 | 1.264879 .131234 2.26 0.024 1.032131 1.550112

5 | .9821288 .1510958 -0.12 0.907 .7264658 1.327766

6 | 1.065757 .0650495 1.04 0.297 .9455933 1.201191

7 | 1.022883 .2326243 0.10 0.921 .6550064 1.597373

8 | .9133844 .0433274 -1.91 0.056 .8322924 1.002377

9 | .8078925 .0403383 -4.27 0.000 .7325762 .8909521

10 | 1.183912 .1504051 1.33 0.184 .9229588 1.518647

11 | .8966099 .2374959 -0.41 0.680 .5335012 1.506855

12 | .9505632 .0945229 -0.51 0.610 .7822373 1.15511

13 | 1.360438 .2013257 2.08 0.038 1.017919 1.818213

14 | .6512428 .0874228 -3.19 0.001 .5005848 .8472434

15 | .6858485 .0695193 -3.72 0.000 .5622744 .8365813

17 | 1.100627 .0482415 2.19 0.029 1.010023 1.199359

|

time |

2000 | 1.13642 .0668015 2.18 0.030 1.012753 1.275189

2002 | 1.016522 .0568863 0.29 0.770 .9109236 1.134361

2003 | .8885114 .051858 -2.03 0.043 .7924695 .9961928

2004 | .9088443 .0575533 -1.51 0.131 .8027613 1.028946

2005 | .7956826 .0501792 -3.62 0.000 .7031684 .9003686

2006 | .7629769 .0540921 -3.82 0.000 .6639945 .8767147

2007 | .73688 .0528933 -4.25 0.000 .6401732 .8481958

2008 | .6887815 .0527157 -4.87 0.000 .5928366 .8002542

2009 | .6131406 .0494509 -6.07 0.000 .5234908 .7181432

2010 | .6025226 .0527917 -5.78 0.000 .5074497 .7154079

2011 | .640671 .0551644 -5.17 0.000 .5411817 .7584501

2012 | .6658009 .0568609 -4.76 0.000 .5631834 .7871163

2013 | .6179413 .0640751 -4.64 0.000 .5042955 .7571979

2014 | .6101581 .0621708 -4.85 0.000 .4997018 .7450302

2015 | .6257226 .0765246 -3.83 0.000 .4923587 .7952104

|

\_cons | .0000152 9.20e-07 -182.78 0.000 .0000135 .0000171

ln(hours) | 1 (exposure)

-----------------------------------------------------------------------------------

**. estat gof**

Deviance goodness-of-fit = 8384.875

Prob > chi2(6217) = 0.0000

Pearson goodness-of-fit = 9307.932

Prob > chi2(6217) = 0.0000

**. glm dv `ss\_lag\_1\_vars' `covariates' ib(freq).state ib(freq).time, family(nbinomial) link(log) vce(cl mineid) exposure(hours) iter(50) eform**

Iteration 0: log pseudolikelihood = -9217.1304

Iteration 1: log pseudolikelihood = -9090.1192

Iteration 2: log pseudolikelihood = -9089.0362

Iteration 3: log pseudolikelihood = -9089.0353

Iteration 4: log pseudolikelihood = -9089.0353

Generalized linear models No. of obs = 6,253

Optimization : ML Residual df = 6,217

Scale parameter = 1

Deviance = 3864.308159 (1/df) Deviance = .6215712

Pearson = 4143.416897 (1/df) Pearson = .6664656

Variance function: V(u) = u+(1)u^2 [Neg. Binomial]

Link function : g(u) = ln(u) [Log]

AIC = 2.91861

Log pseudolikelihood = -9089.035254 BIC = -50477.35

(Std. Err. adjusted for 1,238 clusters in mineid)

-----------------------------------------------------------------------------------

| Robust

dv | IRR Std. Err. z P>|z| [95% Conf. Interval]

------------------+----------------------------------------------------------------

p47\_ss\_1lag | 1.033748 .2208648 0.16 0.877 .6800671 1.571367

p48\_ss\_1lag | .9938587 .0252632 -0.24 0.809 .9455569 1.044628

p71\_ss\_1lag | .8878219 .1322517 -0.80 0.424 .6630239 1.188838

p72\_ss\_1lag | .9497204 .0894919 -0.55 0.584 .7895638 1.142363

p75\_ss\_1lag | 1.00398 .0008845 4.51 0.000 1.002248 1.005715

p77\_ss\_1lag | 1.015126 .0194633 0.78 0.434 .9776863 1.053999

mine\_time | .9957789 .0070093 -0.60 0.548 .9821354 1.009612

onsite\_insp\_hours | .9998808 .0000491 -2.43 0.015 .9997846 .999977

|

state |

1 | 1.009474 .1071157 0.09 0.929 .8199247 1.242844

2 | 1.61964 .0875168 8.92 0.000 1.456881 1.800582

3 | .7290585 .1215489 -1.90 0.058 .5258353 1.010823

4 | 1.101517 .0873419 1.22 0.223 .9429691 1.286723

5 | .9022018 .1526195 -0.61 0.543 .647607 1.256886

6 | .891445 .0442391 -2.32 0.021 .8088213 .982509

7 | .9137135 .2090166 -0.39 0.693 .5835706 1.430628

8 | 1.103442 .043502 2.50 0.013 1.021391 1.192085

9 | .7404133 .031763 -7.01 0.000 .6807043 .8053598

10 | .8265251 .1373345 -1.15 0.252 .5967896 1.144698

11 | .8620687 .2361202 -0.54 0.588 .5039625 1.474638

12 | .9735216 .0880733 -0.30 0.767 .8153393 1.162392

13 | 1.342953 .2157899 1.84 0.066 .9801381 1.840071

14 | .6270755 .0918477 -3.19 0.001 .4705918 .835594

15 | .6568717 .0447909 -6.16 0.000 .5746966 .750797

17 | 1.06928 .0436482 1.64 0.101 .9870636 1.158344

|

time |

2000 | 1.0815 .0727019 1.17 0.244 .9479947 1.233806

2002 | .9454484 .0644366 -0.82 0.410 .8272267 1.080566

2003 | .880102 .0675001 -1.67 0.096 .7572678 1.022861

2004 | .8410841 .0610149 -2.39 0.017 .7296096 .9695903

2005 | .7435566 .0531964 -4.14 0.000 .6462736 .8554835

2006 | .7502242 .0580176 -3.72 0.000 .6447102 .8730067

2007 | .6970855 .053623 -4.69 0.000 .5995257 .8105211

2008 | .6345191 .0485601 -5.94 0.000 .5461372 .7372038

2009 | .5256155 .0439046 -7.70 0.000 .4462388 .6191116

2010 | .5679145 .0491313 -6.54 0.000 .4793403 .6728557

2011 | .6017021 .0509748 -6.00 0.000 .5096473 .7103843

2012 | .618055 .0549316 -5.41 0.000 .5192468 .7356655

2013 | .5144095 .0494101 -6.92 0.000 .4261372 .6209672

2014 | .4946163 .0494524 -7.04 0.000 .4065971 .6016898

2015 | .5401663 .0567931 -5.86 0.000 .4395741 .6637781

|

\_cons | .0000172 1.13e-06 -166.79 0.000 .0000152 .0000196

ln(hours) | 1 (exposure)

-----------------------------------------------------------------------------------

**. nbreg dv `ss\_lag\_1\_vars' `covariates' ib(freq).state ib(freq).time, vce(cl mineid) exposure(hours) iter(50) irr**

Fitting Poisson model:

Iteration 0: log pseudolikelihood = -9723.3458

Iteration 1: log pseudolikelihood = -8990.7106

Iteration 2: log pseudolikelihood = -8979.8766

Iteration 3: log pseudolikelihood = -8979.8704

Iteration 4: log pseudolikelihood = -8979.8704

Fitting constant-only model:

Iteration 0: log pseudolikelihood = -9249.9658

Iteration 1: log pseudolikelihood = -8971.6355

Iteration 2: log pseudolikelihood = -8961.958

Iteration 3: log pseudolikelihood = -8961.9317

Iteration 4: log pseudolikelihood = -8961.9317

Fitting full model:

Iteration 0: log pseudolikelihood = -8711.386

Iteration 1: log pseudolikelihood = -8673.1036

Iteration 2: log pseudolikelihood = -8672.2764

Iteration 3: log pseudolikelihood = -8672.2761

Negative binomial regression Number of obs = 6,253

Wald chi2(35) = .

Dispersion = mean Prob > chi2 = .

Log pseudolikelihood = -8672.2761 Pseudo R2 = 0.0323

(Std. Err. adjusted for 1,238 clusters in mineid)

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| Robust

dv | IRR Std. Err. z P>|z| [95% Conf. Interval]

------------------+----------------------------------------------------------------

p47\_ss\_1lag | .9626922 .2249463 -0.16 0.871 .6089653 1.521887

p48\_ss\_1lag | .9924926 .0237941 -0.31 0.753 .9469356 1.040241

p71\_ss\_1lag | .8044743 .1218738 -1.44 0.151 .5978048 1.082592

p72\_ss\_1lag | .9782909 .0869407 -0.25 0.805 .8219053 1.164432

p75\_ss\_1lag | 1.003262 .0008525 3.83 0.000 1.001593 1.004934

p77\_ss\_1lag | 1.009788 .0173739 0.57 0.571 .9763038 1.044421

mine\_time | .9943377 .0074759 -0.76 0.450 .9797927 1.009099

onsite\_insp\_hours | .999879 .0000507 -2.39 0.017 .9997796 .9999783

|

state |

1 | 1.046153 .0969303 0.49 0.626 .8724245 1.254476

2 | 1.835929 .1052076 10.60 0.000 1.640884 2.054158

3 | .7269963 .1202851 -1.93 0.054 .52565 1.005467

4 | 1.140177 .0944097 1.58 0.113 .9693721 1.341078

5 | .9360104 .1514518 -0.41 0.683 .6816342 1.285316

6 | .9531306 .0496088 -0.92 0.356 .8606941 1.055494

7 | .9590154 .2198178 -0.18 0.855 .6119558 1.502904

8 | .9712769 .0411323 -0.69 0.491 .893914 1.055335

9 | .7628849 .0329142 -6.27 0.000 .7010265 .8302016

10 | .9631141 .1426599 -0.25 0.800 .7204348 1.28754

11 | .8547844 .2182161 -0.61 0.539 .5182689 1.409802

12 | .9599187 .0874032 -0.45 0.653 .8030272 1.147463

13 | 1.320025 .198903 1.84 0.065 .9824758 1.773545

14 | .6230079 .0872796 -3.38 0.001 .4734188 .8198637

15 | .6688785 .051739 -5.20 0.000 .5747848 .7783757

17 | 1.072023 .0428487 1.74 0.082 .9912467 1.159382

|

time |

2000 | 1.117668 .0680999 1.83 0.068 .991856 1.259438

2002 | .9908276 .0601051 -0.15 0.879 .8797574 1.11592

2003 | .8829999 .0572288 -1.92 0.055 .7776655 1.002602

2004 | .8874633 .0587833 -1.80 0.071 .7794154 1.01049

2005 | .7814674 .0504182 -3.82 0.000 .6886422 .886805

2006 | .7717013 .0548324 -3.65 0.000 .6713795 .8870139

2007 | .7247807 .0522979 -4.46 0.000 .629197 .834885

2008 | .6674248 .0481408 -5.61 0.000 .5794364 .7687743

2009 | .5754359 .0449262 -7.08 0.000 .4937884 .6705839

2010 | .5870752 .0478846 -6.53 0.000 .5003405 .6888454

2011 | .6258015 .0506359 -5.79 0.000 .5340265 .7333486

2012 | .642737 .0532028 -5.34 0.000 .5464806 .7559478

2013 | .5615007 .0526476 -6.16 0.000 .4672396 .6747781

2014 | .5459824 .0521586 -6.33 0.000 .4527537 .6584083

2015 | .5801155 .0610552 -5.17 0.000 .4719852 .7130181

|

\_cons | .0000164 1.00e-06 -180.02 0.000 .0000145 .0000185

ln(hours) | 1 (exposure)

------------------+----------------------------------------------------------------

/lnalpha | -1.522958 .0972024 -1.713471 -1.332445

------------------+----------------------------------------------------------------

alpha | .2180659 .0211965 .180239 .2638314

-----------------------------------------------------------------------------------

(est1 stored)

**. lrtest pois nbin, stats force**

Likelihood-ratio test LR chi2(1) = 615.19

(Assumption: pois nested in nbin) Prob > chi2 = 0.0000

Akaike's information criterion and Bayesian information criterion

-----------------------------------------------------------------------------

Model | Obs ll(null) ll(model) df AIC BIC

-------------+---------------------------------------------------------------

pois | 6,253 -9569.622 -8979.87 36 18031.74 18274.41

nbin | 6,253 -8961.932 -8672.276 37 17418.55 17667.96

-----------------------------------------------------------------------------

Note: N=Obs used in calculating BIC; see [R] BIC note.

**. summ dv cssv2\_yhat**

Variable | Obs Mean Std. Dev. Min Max

-------------+---------------------------------------------------------

dv | 6,253 1.881017 3.268911 0 37

cssv2\_yhat | 6,253 1.922936 2.893737 .000658 36.51684