**. glm MR `part\_sig\_sub\_vars' `covariates' ib(freq).state ib(freq).time, family(poisson) link(log) vce(cl mineid) exposure(hours) iter(50) eform**

Iteration 0: log pseudolikelihood = -9589.1096

Iteration 1: log pseudolikelihood = -8986.2429

Iteration 2: log pseudolikelihood = -8982.7561

Iteration 3: log pseudolikelihood = -8982.7536

Iteration 4: log pseudolikelihood = -8982.7536

Generalized linear models No. of obs = 6,253

Optimization : ML Residual df = 6,217

Scale parameter = 1

Deviance = 8390.641604 (1/df) Deviance = 1.349629

Pearson = 9300.638015 (1/df) Pearson = 1.496001

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

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

AIC = 2.884617

Log pseudolikelihood = -8982.753649 BIC = -45951.02

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

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

| Robust

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

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

p47\_ss | .8280463 .2292854 -0.68 0.496 .4812353 1.424793

p48\_ss | .9952598 .0268468 -0.18 0.860 .9440079 1.049294

p71\_ss | .7599296 .090802 -2.30 0.022 .6012644 .9604644

p72\_ss | .9889366 .0876066 -0.13 0.900 .8313107 1.17645

p75\_ss | 1.002324 .0008114 2.87 0.004 1.000735 1.003915

p77\_ss | 1.015647 .0175438 0.90 0.369 .9818375 1.050621

mine\_time | .9938073 .0091817 -0.67 0.501 .9759735 1.011967

onsite\_insp\_hours | .9998884 .0000533 -2.09 0.036 .9997839 .9999929

|

state |

1 | 1.098144 .0880552 1.17 0.243 .9384373 1.28503

2 | 2.041828 .1420459 10.26 0.000 1.78157 2.340106

3 | .7430096 .1191635 -1.85 0.064 .5425992 1.017442

4 | 1.261992 .1279146 2.30 0.022 1.034617 1.539337

5 | .9791785 .1507257 -0.14 0.891 .724162 1.324

6 | 1.063938 .0646009 1.02 0.307 .9445666 1.198396

7 | 1.022859 .2332785 0.10 0.921 .6541637 1.599356

8 | .9100042 .0424348 -2.02 0.043 .8305211 .9970942

9 | .8041512 .0399518 -4.39 0.000 .7295387 .8863946

10 | 1.184288 .1504414 1.33 0.183 .9232694 1.5191

11 | .8960391 .2373145 -0.41 0.679 .5331969 1.505797

12 | .9469743 .093523 -0.55 0.581 .7803217 1.149219

13 | 1.369189 .203013 2.12 0.034 1.023891 1.830936

14 | .6494299 .0849706 -3.30 0.001 .5025302 .8392715

15 | .6858246 .0692767 -3.73 0.000 .5626408 .835978

17 | 1.095623 .0466182 2.15 0.032 1.007959 1.190911

|

time |

2000 | 1.118084 .0663048 1.88 0.060 .9953974 1.255893

2002 | 1.018997 .0566514 0.34 0.735 .9137978 1.136307

2003 | .888899 .0517325 -2.02 0.043 .7930743 .9963019

2004 | .8986563 .057958 -1.66 0.098 .7919471 1.019744

2005 | .803233 .0491277 -3.58 0.000 .712492 .9055305

2006 | .7587249 .0547495 -3.83 0.000 .6586607 .8739909

2007 | .7365922 .0528742 -4.26 0.000 .6399204 .8478679

2008 | .688636 .0531388 -4.83 0.000 .5919793 .8010744

2009 | .6165182 .0505245 -5.90 0.000 .5250356 .7239408

2010 | .6036332 .0517655 -5.89 0.000 .5102429 .7141167

2011 | .636254 .0553164 -5.20 0.000 .53657 .7544573

2012 | .6639122 .0564591 -4.82 0.000 .5619846 .7843264

2013 | .6165553 .0640098 -4.66 0.000 .503039 .7556879

2014 | .6076692 .0617481 -4.90 0.000 .4979351 .7415864

2015 | .6251109 .0755914 -3.89 0.000 .493203 .7922979

|

\_cons | .0000152 9.11e-07 -184.94 0.000 .0000135 .0000171

ln(hours) | 1 (exposure)

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

**. estat gof**

Deviance goodness-of-fit = 8390.642

Prob > chi2(6217) = 0.0000

Pearson goodness-of-fit = 9300.638

Prob > chi2(6217) = 0.0000

**. glm MR `part\_sig\_sub\_vars' `covariates' ib(freq).state ib(freq).time, family(nbinomial) link(log) vce(cl mineid) exposure(hours) iter(50) eform**

Iteration 0: log pseudolikelihood = -9216.7199

Iteration 1: log pseudolikelihood = -9089.4409

Iteration 2: log pseudolikelihood = -9088.3596

Iteration 3: log pseudolikelihood = -9088.3587

Iteration 4: log pseudolikelihood = -9088.3587

Generalized linear models No. of obs = 6,253

Optimization : ML Residual df = 6,217

Scale parameter = 1

Deviance = 3862.954951 (1/df) Deviance = .6213535

Pearson = 4135.171224 (1/df) Pearson = .6651393

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

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

AIC = 2.918394

Log pseudolikelihood = -9088.35865 BIC = -50478.7

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

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

| Robust

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

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

p47\_ss | 1.02444 .2386353 0.10 0.917 .6489421 1.617214

p48\_ss | 1.000024 .0287154 0.00 0.999 .9452975 1.057919

p71\_ss | .777126 .1110296 -1.76 0.078 .587325 1.028263

p72\_ss | .8714583 .0635114 -1.89 0.059 .7554601 1.005268

p75\_ss | 1.003956 .0008964 4.42 0.000 1.0022 1.005714

p77\_ss | 1.017143 .0208276 0.83 0.406 .97713 1.058795

mine\_time | .9965756 .0070039 -0.49 0.625 .9829423 1.010398

onsite\_insp\_hours | .9998798 .0000494 -2.43 0.015 .9997829 .9999767

|

state |

1 | 1.007094 .1069214 0.07 0.947 .8178986 1.240054

2 | 1.603595 .0879471 8.61 0.000 1.440163 1.785573

3 | .731814 .1228591 -1.86 0.063 .5266214 1.016958

4 | 1.099751 .0883602 1.18 0.237 .939516 1.287315

5 | .8991725 .1525219 -0.63 0.531 .6448492 1.253799

6 | .8900601 .044014 -2.36 0.019 .8078429 .9806449

7 | .9123986 .2104166 -0.40 0.691 .5806056 1.433798

8 | 1.098188 .0429458 2.40 0.017 1.01716 1.18567

9 | .7436952 .0319258 -6.90 0.000 .6836818 .8089765

10 | .823508 .1362267 -1.17 0.240 .5954702 1.138874

11 | .8599044 .2365361 -0.55 0.583 .5015428 1.474322

12 | .9737661 .087797 -0.29 0.768 .8160342 1.161986

13 | 1.351217 .2181308 1.86 0.062 .9847206 1.854116

14 | .6318581 .0894437 -3.24 0.001 .4787692 .8338978

15 | .6567064 .0447224 -6.17 0.000 .5746502 .7504796

17 | 1.067192 .0426309 1.63 0.104 .9868241 1.154105

|

time |

2000 | 1.062759 .0711846 0.91 0.363 .9320095 1.21185

2002 | .9505739 .0649428 -0.74 0.458 .8314424 1.086775

2003 | .8829549 .0679555 -1.62 0.106 .7593235 1.026716

2004 | .8417816 .0611789 -2.37 0.018 .730022 .9706507

2005 | .7460655 .0534256 -4.09 0.000 .6483695 .8584822

2006 | .7464159 .0574851 -3.80 0.000 .6418386 .8680325

2007 | .6955013 .0535359 -4.72 0.000 .5981046 .8087584

2008 | .6348346 .0487114 -5.92 0.000 .5461944 .73786

2009 | .5308712 .044506 -7.55 0.000 .4504308 .6256772

2010 | .5647831 .0485754 -6.64 0.000 .4771689 .6684843

2011 | .6019713 .0509672 -5.99 0.000 .5099258 .7106317

2012 | .6213204 .0552101 -5.36 0.000 .5220096 .7395248

2013 | .5150538 .0495199 -6.90 0.000 .426593 .6218583

2014 | .4940307 .0494647 -7.04 0.000 .4060015 .6011465

2015 | .5421496 .0568712 -5.84 0.000 .4413961 .6659011

|

\_cons | .0000172 1.13e-06 -166.50 0.000 .0000151 .0000195

ln(hours) | 1 (exposure)

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

**. nbreg MR `part\_sig\_sub\_vars' `covariates' ib(freq).state ib(freq).time, vce(cl mineid) exposure(hours) iter(50) irr**

Fitting Poisson model:

Iteration 0: log pseudolikelihood = -9768.8438

Iteration 1: log pseudolikelihood = -8994.0968

Iteration 2: log pseudolikelihood = -8982.7603

Iteration 3: log pseudolikelihood = -8982.7536

Iteration 4: log pseudolikelihood = -8982.7536

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 = -8710.9283

Iteration 1: log pseudolikelihood = -8672.6321

Iteration 2: log pseudolikelihood = -8671.7972

Iteration 3: log pseudolikelihood = -8671.7968

Negative binomial regression Number of obs = 6,253

Wald chi2(35) = .

Dispersion = mean Prob > chi2 = .

Log pseudolikelihood = -8671.7968 Pseudo R2 = 0.0324

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

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| Robust

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

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

p47\_ss | .9417173 .2676108 -0.21 0.833 .5395503 1.643649

p48\_ss | .9964365 .0277534 -0.13 0.898 .9434989 1.052344

p71\_ss | .7746687 .1086663 -1.82 0.069 .5884561 1.019807

p72\_ss | .9096809 .0685354 -1.26 0.209 .784801 1.054432

p75\_ss | 1.003216 .0008527 3.78 0.000 1.001546 1.004889

p77\_ss | 1.010009 .0182275 0.55 0.581 .9749085 1.046374

mine\_time | .9949892 .0074937 -0.67 0.505 .9804097 1.009785

onsite\_insp\_hours | .999879 .000051 -2.37 0.018 .999779 .9999789

|

state |

1 | 1.043992 .0970546 0.46 0.643 .8700922 1.252648

2 | 1.826352 .1058337 10.39 0.000 1.630268 2.046021

3 | .7303524 .1218085 -1.88 0.060 .5267065 1.012736

4 | 1.139697 .0948193 1.57 0.116 .9682157 1.34155

5 | .933507 .1512395 -0.42 0.671 .6795361 1.282397

6 | .9520471 .0493037 -0.95 0.343 .8601561 1.053755

7 | .9588338 .2209604 -0.18 0.855 .6103606 1.506261

8 | .9677677 .0409417 -0.77 0.439 .8907601 1.051433

9 | .765547 .0329197 -6.21 0.000 .7036698 .8328654

10 | .9610519 .1417978 -0.27 0.788 .7197088 1.283326

11 | .8533061 .218167 -0.62 0.535 .5169825 1.408425

12 | .959429 .0871152 -0.46 0.648 .8030166 1.146307

13 | 1.328327 .2004402 1.88 0.060 .9882382 1.785454

14 | .6276548 .0847221 -3.45 0.001 .4817526 .8177446

15 | .6693614 .0516057 -5.21 0.000 .5754872 .7785485

17 | 1.069257 .0418981 1.71 0.087 .9902124 1.154611

|

time |

2000 | 1.100678 .0665818 1.59 0.113 .9776194 1.239227

2002 | .9968517 .060716 -0.05 0.959 .884679 1.123247

2003 | .8867201 .0576883 -1.85 0.065 .780565 1.007312

2004 | .8858175 .0590003 -1.82 0.069 .777409 1.009343

2005 | .7869218 .0506225 -3.72 0.000 .6937035 .8926665

2006 | .7693429 .0546058 -3.69 0.000 .6694283 .8841702

2007 | .7245982 .0522543 -4.47 0.000 .6290902 .8346061

2008 | .6682153 .0483892 -5.57 0.000 .5797972 .7701169

2009 | .5815296 .0456112 -6.91 0.000 .4986655 .6781633

2010 | .5866331 .0473691 -6.61 0.000 .5007654 .6872248

2011 | .6251532 .0505744 -5.81 0.000 .5334883 .7325681

2012 | .6445888 .0531711 -5.32 0.000 .5483634 .7576996

2013 | .5623678 .052623 -6.15 0.000 .4681339 .6755708

2014 | .5462049 .0520999 -6.34 0.000 .4530681 .6584877

2015 | .5820485 .0607177 -5.19 0.000 .4744213 .7140921

|

\_cons | .0000163 9.96e-07 -180.57 0.000 .0000145 .0000184

ln(hours) | 1 (exposure)

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

/lnalpha | -1.51978 .0969831 -1.709863 -1.329696

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

alpha | .2187601 .021216 .1808906 .2645576

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**. lrtest pois nbin, stats force**

Likelihood-ratio test LR chi2(1) = 621.91

(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 -8982.754 36 18037.51 18280.18

nbin | 6,253 -8961.932 -8671.797 37 17417.59 17667

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

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

**. summ MR pcssv1\_yhat**

Variable | Obs Mean Std. Dev. Min Max

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

MR | 6,253 1.881017 3.268911 0 37

pcssv1\_yhat | 6,253 1.924011 2.900447 .000657 32.89595