. // Model SP.C.PP.1

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

Iteration 0: log pseudolikelihood = -20750.927

Iteration 1: log pseudolikelihood = -19258.228

Iteration 2: log pseudolikelihood = -19245.466

Iteration 3: log pseudolikelihood = -19244.959

Iteration 4: log pseudolikelihood = -19244.885

Iteration 5: log pseudolikelihood = -19244.869

Iteration 6: log pseudolikelihood = -19244.867

Iteration 7: log pseudolikelihood = -19244.866

Iteration 8: log pseudolikelihood = -19244.866

Iteration 9: log pseudolikelihood = -19244.866

Iteration 10: log pseudolikelihood = -19244.866

Generalized linear models No. of obs = 28,337

Optimization : ML Residual df = 27,946

Scale parameter = 1

Deviance = 21576.98725 (1/df) Deviance = .7720957

Pearson = 345196.1305 (1/df) Pearson = 12.35226

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

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

AIC = 1.385882

Log pseudolikelihood = -19244.86576 BIC = -264923.3

(Std. Err. adjusted for 1,544 clusters in mineid)

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| Robust

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

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

sp47\_41\_pp | 1.00133 .0008871 1.50 0.134 .9995928 1.00307

sp47\_42\_pp | .9956226 .0039877 -1.10 0.273 .9878375 1.003469

sp47\_44\_pp | .9974819 .0021103 -1.19 0.233 .9933544 1.001627

sp48\_11\_pp | 1.001432 .0010625 1.35 0.177 .9993516 1.003516

sp48\_24\_pp | .9517632 .0027303 -17.23 0.000 .946427 .9571296

sp48\_25\_pp | 1.000507 .0029068 0.17 0.862 .9948257 1.00622

sp48\_26\_pp | 1.004297 .0013227 3.26 0.001 1.001708 1.006893

sp48\_27\_pp | 1.000975 .0012253 0.80 0.426 .9985763 1.003379

sp48\_28\_pp | 1.002041 .0020537 0.99 0.320 .9980239 1.006074

sp48\_4\_pp | 1.015448 .0014584 10.67 0.000 1.012593 1.01831

sp48\_5\_pp | .9997677 .0034628 -0.07 0.947 .9930038 1.006578

sp48\_6\_pp | 1.00135 .0012302 1.10 0.272 .9989416 1.003764

sp48\_7\_pp | 1.000027 .0008513 0.03 0.975 .99836 1.001697

sp48\_8\_pp | 1.003279 .0017822 1.84 0.065 .9997921 1.006778

sp71\_701\_pp | .859376 .0118176 -11.02 0.000 .8365232 .8828531

sp72\_503\_pp | .9974344 .0014335 -1.79 0.074 .9946286 1.000248

sp72\_610\_pp | 1.00333 .0026939 1.24 0.216 .9980637 1.008624

sp72\_620\_pp | 1.006805 .0054615 1.25 0.211 .996157 1.017566

sp72\_630\_pp | 1.000258 .0001891 1.37 0.172 .9998877 1.000629

sp75\_100\_pp | 1.001958 .0032779 0.60 0.550 .9955543 1.008404

sp75\_1001\_1\_pp | 1.001716 .0035498 0.48 0.629 .9947822 1.008697

sp75\_1001\_pp | 1.004912 .0063268 0.78 0.436 .9925884 1.017389

sp75\_1003\_1\_pp | .9951346 .0031984 -1.52 0.129 .9888855 1.001423

sp75\_1100\_2\_pp | 1.00064 .0001872 3.42 0.001 1.000273 1.001007

sp75\_1101\_20\_pp | .7918455 .0045498 -40.62 0.000 .7829781 .8008134

sp75\_1102\_pp | .9992856 .0012562 -0.57 0.570 .9968266 1.001751

sp75\_1103\_4\_pp | 1.000367 .0003164 1.16 0.246 .9997467 1.000987

sp75\_1104\_pp | .9992902 .0011919 -0.60 0.552 .9969569 1.001629

sp75\_1106\_2\_pp | 1.001049 .0007954 1.32 0.187 .9994911 1.002609

sp75\_1106\_3\_pp | 1.000685 .0002909 2.36 0.018 1.000115 1.001256

sp75\_1106\_4\_pp | 1.000183 .0022566 0.08 0.935 .9957702 1.004616

sp75\_1106\_5\_pp | 1.000447 .0009474 0.47 0.637 .9985915 1.002305

sp75\_1106\_6\_pp | 1.016203 .0063932 2.55 0.011 1.00375 1.028811

sp75\_1106\_pp | 1.00017 .0017557 0.10 0.923 .9967352 1.003617

sp75\_1107\_14\_pp | 1.009556 .003422 2.81 0.005 1.002871 1.016286

sp75\_1400\_1\_pp | .9987498 .0047777 -0.26 0.794 .9894294 1.008158

sp75\_1400\_2\_pp | .9972316 .0030089 -0.92 0.358 .9913518 1.003146

sp75\_1400\_3\_pp | 1.000139 .0016948 0.08 0.935 .9968228 1.003466

sp75\_1400\_4\_pp | .9952671 .0037243 -1.27 0.205 .9879942 1.002593

sp75\_1400\_pp | .9976056 .0013603 -1.76 0.079 .9949431 1.000275

sp75\_1401\_1\_pp | 1.020656 .009705 2.15 0.032 1.001811 1.039856

sp75\_1401\_pp | .9896233 .0100033 -1.03 0.302 .9702101 1.009425

sp75\_1403\_10\_pp | 1.000307 .0002949 1.04 0.298 .9997291 1.000885

sp75\_1403\_11\_pp | 1.001965 .0032814 0.60 0.549 .9955539 1.008417

sp75\_1403\_3\_pp | .9967214 .0033116 -0.99 0.323 .9902519 1.003233

sp75\_1403\_4\_pp | 1.002218 .0034108 0.65 0.515 .9955548 1.008925

sp75\_1403\_5\_pp | .9993126 .0003027 -2.27 0.023 .9987195 .999906

sp75\_1403\_6\_pp | 1.000038 .0002211 0.17 0.864 .9996045 1.000471

sp75\_1403\_7\_pp | 1.000076 .0009504 0.08 0.936 .9982149 1.00194

sp75\_1403\_8\_pp | .9997133 .0003231 -0.89 0.375 .9990802 1.000347

sp75\_1403\_9\_pp | .9983303 .0008096 -2.06 0.039 .9967448 .9999183

sp75\_1404\_1\_pp | .9885618 .0083207 -1.37 0.172 .9723874 1.005005

sp75\_1404\_pp | 1.008903 .0049239 1.82 0.069 .9992989 1.0186

sp75\_1405\_1\_pp | .9962804 .003568 -1.04 0.298 .9893117 1.003298

sp75\_1405\_pp | .9992814 .0003224 -2.23 0.026 .9986498 .9999135

sp75\_1431\_pp | .6506304 .0152813 -18.30 0.000 .6213586 .6812813

sp75\_1432\_pp | .9848668 .006532 -2.30 0.021 .9721472 .9977528

sp75\_1433\_pp | 1.001408 .0020475 0.69 0.491 .9974034 1.00543

sp75\_1434\_pp | 1.001654 .002091 0.79 0.429 .9975638 1.005761

sp75\_1435\_pp | .9943765 .0056522 -0.99 0.321 .9833599 1.005516

sp75\_1437\_pp | 1.01066 .005646 1.90 0.058 .9996538 1.021786

sp75\_150\_pp | 1.00293 .0022919 1.28 0.201 .9984476 1.007432

sp75\_151\_pp | 1.001708 .0057995 0.29 0.768 .9904057 1.01314

sp75\_153\_pp | 1.003016 .0033785 0.89 0.371 .9964163 1.00966

sp75\_156\_pp | 1.006424 .004605 1.40 0.162 .9974386 1.01549

sp75\_160\_pp | 1.00629 .0122365 0.52 0.606 .98259 1.030561

sp75\_1600\_2\_pp | .9991885 .0005167 -1.57 0.116 .9981763 1.000202

sp75\_1712\_10\_pp | .9976154 .001347 -1.77 0.077 .9949789 1.000259

sp75\_1712\_6\_pp | 1.000319 .001053 0.30 0.762 .998257 1.002385

sp75\_1720\_pp | .999307 .0006851 -1.01 0.312 .997965 1.000651

sp75\_1721\_pp | .610927 .0155876 -19.31 0.000 .5811271 .642255

sp75\_1725\_pp | 1.000006 .0000988 0.06 0.956 .9998118 1.000199

sp75\_1726\_pp | 1.000695 .0016907 0.41 0.681 .9973868 1.004014

sp75\_1727\_pp | .5786786 .0133054 -23.79 0.000 .5531793 .6053534

sp75\_1728\_pp | 1.005374 .0033995 1.58 0.113 .9987328 1.012059

sp75\_1729\_pp | .9921496 .0030274 -2.58 0.010 .9862337 .998101

sp75\_1730\_pp | .9976123 .0026074 -0.91 0.360 .992515 1.002736

sp75\_1731\_pp | .9999793 .0000847 -0.24 0.807 .9998133 1.000145

sp75\_1903\_pp | .999166 .0008442 -0.99 0.323 .9975127 1.000822

sp75\_1909\_pp | 1.000412 .0001808 2.28 0.023 1.000058 1.000766

sp75\_1910\_pp | .9999187 .0002337 -0.35 0.728 .9994607 1.000377

sp75\_1911\_pp | .9999546 .0003265 -0.14 0.889 .9993149 1.000595

sp75\_1912\_pp | .998201 .0016278 -1.10 0.270 .9950156 1.001397

sp75\_1913\_pp | 1.002553 .0035222 0.73 0.468 .9956737 1.009481

sp75\_1914\_pp | 1.000258 .0001926 1.34 0.180 .9998806 1.000635

sp75\_1915\_pp | .9998774 .002214 -0.06 0.956 .9955475 1.004226

sp75\_202\_pp | 1.000086 .0000692 1.24 0.215 .9999502 1.000221

sp75\_208\_pp | 1.0001 .0004149 0.24 0.810 .9992871 1.000913

sp75\_211\_pp | 1.000208 .000397 0.52 0.601 .9994299 1.000986

sp75\_212\_pp | .9988904 .0007662 -1.45 0.148 .9973899 1.000393

sp75\_214\_pp | .9994242 .0008721 -0.66 0.509 .9977163 1.001135

sp75\_312\_pp | .9998766 .0009182 -0.13 0.893 .9980786 1.001678

sp75\_320\_pp | .9995918 .0004224 -0.97 0.334 .9987643 1.00042

sp75\_324\_pp | .9996525 .0015563 -0.22 0.823 .9966069 1.002708

sp75\_337\_pp | 1.00062 .0005063 1.23 0.221 .9996283 1.001613

sp75\_340\_pp | 1.000262 .0002541 1.03 0.303 .999764 1.00076

sp75\_341\_pp | .9855911 .0113673 -1.26 0.208 .9635615 1.008124

sp75\_342\_pp | 1.000185 .0001881 0.98 0.326 .999816 1.000553

sp75\_344\_pp | .9996765 .0017547 -0.18 0.854 .9962434 1.003122

sp75\_352\_pp | .9976295 .0012505 -1.89 0.058 .9951816 1.000084

sp75\_382\_pp | .9967307 .0011709 -2.79 0.005 .9944384 .9990282

sp75\_503\_pp | 1.000006 .0000866 0.07 0.945 .9998363 1.000176

sp75\_504\_pp | .9982746 .0024999 -0.69 0.490 .9933869 1.003186

sp75\_505\_pp | .9951594 .0058939 -0.82 0.413 .9836743 1.006779

sp75\_506\_1\_pp | 1.001893 .0018095 1.05 0.295 .9983526 1.005446

sp75\_506\_pp | .9966076 .0017905 -1.89 0.059 .9931045 1.000123

sp75\_507\_pp | .9995966 .0009064 -0.44 0.656 .9978216 1.001375

sp75\_511\_1\_pp | .9844283 .0042146 -3.67 0.000 .9762024 .9927236

sp75\_511\_pp | 1.002176 .0009863 2.21 0.027 1.000245 1.004111

sp75\_512\_1\_pp | 1.009297 .0111312 0.84 0.401 .9877146 1.031351

sp75\_512\_2\_pp | 1.00043 .0003804 1.13 0.259 .9996843 1.001175

sp75\_512\_pp | .9999344 .0001056 -0.62 0.534 .9997274 1.000141

sp75\_513\_1\_pp | .9992168 .0024045 -0.33 0.745 .9945151 1.003941

sp75\_513\_pp | .9961486 .0021757 -1.77 0.077 .9918933 1.000422

sp75\_514\_pp | 1.000732 .0004063 1.80 0.071 .9999363 1.001529

sp75\_515\_pp | .9992384 .0002422 -3.14 0.002 .9987637 .9997133

sp75\_516\_1\_pp | .9989038 .0019641 -0.56 0.577 .9950616 1.002761

sp75\_516\_2\_pp | 1.00096 .0007102 1.35 0.176 .9995694 1.002353

sp75\_516\_pp | 1.000198 .0003876 0.51 0.609 .9994387 1.000958

sp75\_517\_1\_pp | 1.005869 .0046407 1.27 0.205 .9968149 1.015006

sp75\_517\_pp | .9998858 .0000907 -1.26 0.208 .9997081 1.000064

sp75\_518\_1\_pp | 1.000307 .0004984 0.62 0.538 .9993303 1.001284

sp75\_518\_pp | 1.000418 .0002919 1.43 0.152 .9998464 1.000991

sp75\_519\_pp | .9924286 .0035327 -2.14 0.033 .9855287 .9993768

sp75\_520\_pp | 1.000084 .0007906 0.11 0.915 .9985358 1.001635

sp75\_523\_1\_pp | .9994622 .0008804 -0.61 0.541 .9977382 1.001189

sp75\_523\_2\_pp | .9993956 .0005248 -1.15 0.250 .9983675 1.000425

sp75\_523\_pp | .9998523 .0010289 -0.14 0.886 .9978376 1.001871

sp75\_600\_1\_pp | .9946285 .003508 -1.53 0.127 .9877766 1.001528

sp75\_600\_pp | .9985915 .0053075 -0.27 0.791 .9882429 1.009048

sp75\_601\_1\_pp | 1.000133 .0003137 0.42 0.671 .9995186 1.000748

sp75\_601\_2\_pp | 1.005862 .0072123 0.82 0.415 .9918252 1.020098

sp75\_601\_3\_pp | .9945407 .0051642 -1.05 0.292 .9844704 1.004714

sp75\_601\_pp | 1.000224 .0003938 0.57 0.569 .9994526 1.000996

sp75\_602\_pp | .9990874 .001196 -0.76 0.446 .996746 1.001434

sp75\_603\_pp | .9998628 .0009422 -0.15 0.884 .9980178 1.001711

sp75\_604\_pp | 1.000152 .0001418 1.08 0.282 .9998747 1.00043

sp75\_605\_pp | .9998504 .0004356 -0.34 0.731 .9989971 1.000704

sp75\_606\_pp | 1.000219 .0002578 0.85 0.395 .999714 1.000724

sp75\_607\_pp | 1.000081 .0011905 0.07 0.946 .9977504 1.002417

sp75\_700\_1\_pp | 1.000604 .0054378 0.11 0.912 .9900026 1.011319

sp75\_700\_pp | .997693 .0011257 -2.05 0.041 .9954891 .9999017

sp75\_701\_1\_pp | .9977299 .0014579 -1.56 0.120 .9948765 1.000591

sp75\_701\_2\_pp | 1.00069 .0016116 0.43 0.669 .997536 1.003854

sp75\_701\_3\_pp | 1.001381 .0015352 0.90 0.368 .9983761 1.004394

sp75\_701\_4\_pp | 1.004795 .0060779 0.79 0.429 .9929527 1.016778

sp75\_701\_5\_pp | .9969232 .0016028 -1.92 0.055 .9937866 1.00007

sp75\_701\_pp | .9999695 .000278 -0.11 0.913 .9994248 1.000515

sp75\_702\_1\_pp | 1.00937 .0068341 1.38 0.168 .9960642 1.022854

sp75\_702\_pp | 1.005526 .0076537 0.72 0.469 .9906366 1.02064

sp75\_703\_1\_pp | 1.000874 .0095298 0.09 0.927 .9823688 1.019727

sp75\_703\_2\_pp | 1.003836 .00563 0.68 0.495 .9928613 1.014931

sp75\_703\_3\_pp | .9994881 .00232 -0.22 0.825 .9949513 1.004046

sp75\_703\_4\_pp | .699547 .0108156 -23.11 0.000 .6786668 .7210695

sp75\_703\_pp | 1.000797 .0006486 1.23 0.219 .9995261 1.002069

sp75\_704\_pp | .9979592 .003346 -0.61 0.542 .9914226 1.004539

sp75\_705\_1\_pp | .9998046 .0016047 -0.12 0.903 .9966645 1.002955

sp75\_705\_3\_pp | .6927296 .0157042 -16.19 0.000 .6626236 .7242034

sp75\_705\_8\_pp | .999253 .0069258 -0.11 0.914 .9857704 1.01292

sp75\_705\_pp | 1.003842 .0042885 0.90 0.369 .9954716 1.012282

sp75\_706\_pp | .9993062 .0019375 -0.36 0.720 .9955159 1.003111

sp75\_800\_2\_pp | .6596326 .0162161 -16.92 0.000 .6286033 .6921937

sp75\_800\_3\_pp | .9965808 .0026356 -1.30 0.195 .9914286 1.00176

sp75\_800\_4\_pp | 1.004542 .0018242 2.50 0.013 1.000973 1.008124

sp75\_800\_pp | 1.000733 .0012597 0.58 0.561 .9982669 1.003205

sp75\_801\_pp | 1.003506 .0046827 0.75 0.453 .9943703 1.012727

sp75\_802\_pp | 1.001321 .0040272 0.33 0.743 .9934584 1.009245

sp75\_803\_2\_pp | 1.014977 .001509 10.00 0.000 1.012024 1.017939

sp75\_803\_pp | .9982026 .0017795 -1.01 0.313 .994721 1.001696

sp75\_804\_pp | 1.000686 .0009785 0.70 0.483 .9987704 1.002606

sp75\_805\_pp | 1.000304 .0039235 0.08 0.938 .9926434 1.008023

sp75\_806\_pp | 1.008437 .0088441 0.96 0.338 .9912508 1.025921

sp75\_807\_pp | 1.000015 .0002283 0.06 0.948 .9995675 1.000462

sp75\_808\_pp | 1.00004 .0018324 0.02 0.983 .9964544 1.003638

sp75\_809\_pp | .9986421 .0006635 -2.05 0.041 .9973426 .9999433

sp75\_810\_pp | 1.000222 .0011895 0.19 0.852 .9978937 1.002557

sp75\_811\_pp | .9990108 .0009603 -1.03 0.303 .9971305 1.000895

sp75\_812\_pp | 1.00319 .0027967 1.14 0.253 .9977235 1.008686

sp75\_814\_pp | 1.000788 .0022189 0.36 0.723 .9964481 1.005146

sp75\_815\_pp | .997854 .0029448 -0.73 0.467 .992099 1.003642

sp75\_816\_pp | .9998879 .0006587 -0.17 0.865 .9985977 1.00118

sp75\_818\_pp | 1.003878 .0025572 1.52 0.129 .9988782 1.008902

sp75\_820\_pp | 1.002644 .0013948 1.90 0.058 .9999144 1.005382

sp75\_821\_pp | 1.000937 .001225 0.77 0.444 .9985389 1.003341

sp75\_825\_pp | 1.000311 .0021063 0.15 0.883 .9961912 1.004448

sp75\_827\_pp | 1.002578 .0022591 1.14 0.253 .9981595 1.007015

sp75\_831\_pp | .9933158 .0044622 -1.49 0.135 .9846085 1.0021

sp75\_832\_pp | .991785 .0107404 -0.76 0.446 .970956 1.013061

sp75\_834\_pp | .4867964 .0281567 -12.45 0.000 .4346234 .5452324

sp75\_900\_2\_pp | 1.000648 .0025362 0.26 0.798 .995689 1.005631

sp75\_900\_3\_pp | .9998119 .0016973 -0.11 0.912 .9964907 1.003144

sp75\_900\_4\_pp | 1.000889 .0003427 2.60 0.009 1.000218 1.001561

sp75\_900\_pp | 1.000413 .0006682 0.62 0.536 .9991042 1.001723

sp75\_901\_pp | 1.002296 .0016467 1.40 0.163 .9990733 1.005528

sp75\_902\_1\_pp | 1.007707 .0041678 1.86 0.063 .9995713 1.015909

sp75\_902\_2\_pp | 1.000011 .0010608 0.01 0.992 .9979341 1.002092

sp75\_902\_4\_pp | 1.000361 .0009954 0.36 0.717 .9984121 1.002314

sp75\_902\_pp | 1.000534 .0007842 0.68 0.496 .9989982 1.002072

sp75\_903\_pp | 1.001813 .0006933 2.62 0.009 1.000455 1.003173

sp75\_904\_pp | .9998442 .0002267 -0.69 0.492 .9994 1.000289

sp75\_905\_pp | 1.00287 .003852 0.75 0.456 .9953487 1.010449

sp75\_907\_pp | .9972935 .0021641 -1.25 0.212 .993061 1.001544

sp77\_103\_pp | .8888743 .0060598 -17.28 0.000 .8770763 .900831

sp77\_104\_pp | .9980102 .015464 -0.13 0.898 .9681569 1.028784

sp77\_1103\_pp | .9993166 .0005935 -1.15 0.250 .9981541 1.000481

sp77\_1104\_pp | .9999683 .0002379 -0.13 0.894 .999502 1.000435

sp77\_1106\_pp | .7699091 .0078127 -25.77 0.000 .7547478 .785375

sp77\_1111\_pp | .9949765 .0053767 -0.93 0.351 .9844939 1.005571

sp77\_1112\_pp | .9970834 .001381 -2.11 0.035 .9943804 .9997937

sp77\_1403\_pp | 1.001246 .0016412 0.76 0.448 .9980342 1.004468

sp77\_1432\_pp | 1.005948 .0035092 1.70 0.089 .9990937 1.01285

sp77\_1433\_pp | .9992322 .0043129 -0.18 0.859 .9908147 1.007721

sp77\_1434\_pp | .9965778 .0022963 -1.49 0.137 .9920873 1.001089

sp77\_1437\_pp | .99441 .0034188 -1.63 0.103 .9877318 1.001133

sp77\_1438\_pp | .9892418 .0223452 -0.48 0.632 .9464014 1.034021

sp77\_1605\_pp | .999845 .0002753 -0.56 0.574 .9993055 1.000385

sp77\_1606\_pp | 1.000746 .0003736 2.00 0.046 1.000014 1.001478

sp77\_1710\_pp | .9990526 .0005763 -1.64 0.100 .9979237 1.000183

sp77\_1802\_pp | .9785687 .0027722 -7.65 0.000 .9731504 .9840172

sp77\_1906\_pp | 1.001629 .0036889 0.44 0.658 .9944253 1.008886

sp77\_1915\_pp | .9961373 .0027061 -1.42 0.154 .9908476 1.001455

sp77\_1916\_pp | 1.005705 .0022575 2.53 0.011 1.00129 1.01014

sp77\_200\_pp | .9998897 .0004868 -0.23 0.821 .9989359 1.000844

sp77\_202\_pp | .9989814 .0004381 -2.32 0.020 .9981231 .9998405

sp77\_203\_pp | 1.00278 .003042 0.92 0.360 .9968352 1.00876

sp77\_204\_pp | .9985596 .0005611 -2.57 0.010 .9974605 .99966

sp77\_205\_pp | 1.000112 .0002231 0.50 0.617 .9996743 1.000549

sp77\_206\_pp | 1.002451 .0009299 2.64 0.008 1.00063 1.004275

sp77\_207\_pp | 1.00116 .0009607 1.21 0.227 .9992794 1.003045

sp77\_208\_pp | 1.00068 .0004442 1.53 0.126 .9998095 1.001551

sp77\_210\_pp | .9987306 .0013626 -0.93 0.352 .9960636 1.001405

sp77\_216\_pp | .9999406 .0007345 -0.08 0.936 .9985021 1.001381

sp77\_305\_pp | 1.013622 .0071402 1.92 0.055 .9997234 1.027714

sp77\_309\_pp | .998847 .0034406 -0.33 0.738 .9921263 1.005613

sp77\_314\_pp | .9896307 .0077093 -1.34 0.181 .9746356 1.004857

sp77\_315\_pp | .9875158 .0082689 -1.50 0.134 .9714413 1.003856

sp77\_400\_pp | 1.000408 .0001657 2.46 0.014 1.000083 1.000733

sp77\_401\_pp | 1.002503 .0016056 1.56 0.119 .9993607 1.005655

sp77\_402\_pp | .9991221 .0013242 -0.66 0.508 .9965301 1.001721

sp77\_403\_1\_pp | .9993556 .0024274 -0.27 0.791 .9946093 1.004125

sp77\_403\_2\_pp | .9954215 .0042114 -1.08 0.278 .9872014 1.00371

sp77\_403\_pp | 1.010402 .00496 2.11 0.035 1.000727 1.02017

sp77\_404\_pp | .9995022 .0002338 -2.13 0.033 .9990441 .9999605

sp77\_405\_pp | .9981811 .0022593 -0.80 0.421 .9937628 1.002619

sp77\_408\_pp | .9975082 .0028163 -0.88 0.377 .9920036 1.003043

sp77\_409\_pp | .9929985 .0045495 -1.53 0.125 .9841215 1.001956

sp77\_410\_pp | 1.000812 .0004279 1.90 0.058 .999974 1.001651

sp77\_411\_pp | .9901375 .0112339 -0.87 0.382 .9683624 1.012402

sp77\_412\_pp | 1.001134 .001181 0.96 0.337 .9988223 1.003452

sp77\_413\_pp | .9717607 .0030628 -9.09 0.000 .9657761 .9777823

sp77\_500\_pp | 1.000155 .0014729 0.11 0.916 .9972723 1.003046

sp77\_501\_pp | 1.001164 .0017066 0.68 0.495 .9978247 1.004515

sp77\_502\_1\_pp | 1.010409 .0041944 2.49 0.013 1.002222 1.018664

sp77\_502\_2\_pp | 1.000454 .0014951 0.30 0.761 .9975279 1.003389

sp77\_502\_pp | .9997863 .0002371 -0.90 0.367 .9993218 1.000251

sp77\_503\_1\_pp | 1.002707 .0042944 0.63 0.528 .9943252 1.011159

sp77\_503\_pp | .9997766 .0029936 -0.07 0.941 .9939265 1.005661

sp77\_504\_pp | .9972613 .000925 -2.96 0.003 .99545 .9990759

sp77\_505\_pp | 1.000175 .0006099 0.29 0.775 .9989798 1.001371

sp77\_506\_1\_pp | .9998683 .0005157 -0.26 0.798 .998858 1.00088

sp77\_506\_pp | .9966176 .0017112 -1.97 0.048 .9932694 .9999772

sp77\_507\_pp | 1.000369 .0024597 0.15 0.881 .9955594 1.005201

sp77\_508\_1\_pp | 1.003039 .0065342 0.47 0.641 .9903137 1.015928

sp77\_508\_pp | .9987462 .0034786 -0.36 0.719 .9919514 1.005587

sp77\_509\_pp | 1.000055 .0009962 0.06 0.956 .9981048 1.00201

sp77\_510\_pp | .9907523 .0035883 -2.57 0.010 .9837442 .9978103

sp77\_511\_pp | .9974734 .0044718 -0.56 0.573 .9887472 1.006277

sp77\_512\_pp | 1.000113 .0004815 0.24 0.814 .99917 1.001058

sp77\_513\_pp | .9997649 .0007114 -0.33 0.741 .9983716 1.00116

sp77\_514\_pp | 1.001505 .0069085 0.22 0.827 .9880556 1.015137

sp77\_515\_pp | .6093282 .0117242 -25.75 0.000 .5867772 .6327459

sp77\_516\_pp | .9993488 .0004576 -1.42 0.155 .9984523 1.000246

sp77\_600\_pp | .9961651 .0047353 -0.81 0.419 .9869273 1.005489

sp77\_601\_pp | 1.002135 .0041242 0.52 0.604 .9940841 1.010251

sp77\_602\_pp | .9965035 .0039999 -0.87 0.383 .9886946 1.004374

sp77\_603\_pp | 1.013361 .0055311 2.43 0.015 1.002578 1.024259

sp77\_604\_pp | .9974115 .0034482 -0.75 0.453 .990676 1.004193

sp77\_605\_pp | .9872908 .0149195 -0.85 0.397 .958478 1.01697

sp77\_606\_1\_pp | .9849983 .0041816 -3.56 0.000 .9768365 .9932282

sp77\_606\_pp | .594687 .0197891 -15.62 0.000 .5571388 .6347658

sp77\_700\_1\_pp | 1.009162 .0027925 3.30 0.001 1.003703 1.01465

sp77\_700\_pp | .9987027 .0023597 -0.55 0.583 .9940885 1.003338

sp77\_701\_1\_pp | .994904 .0030101 -1.69 0.091 .9890218 1.000821

sp77\_701\_2\_pp | .9981323 .0028326 -0.66 0.510 .992596 1.003699

sp77\_701\_3\_pp | .9756678 .0049684 -4.84 0.000 .9659783 .9854545

sp77\_701\_4\_pp | .9981555 .0032812 -0.56 0.574 .9917451 1.004607

sp77\_701\_pp | 1.000331 .0007038 0.47 0.638 .9989527 1.001711

sp77\_703\_pp | 1.001825 .0039417 0.46 0.643 .9941288 1.00958

sp77\_704\_1\_pp | 1.004402 .0012958 3.40 0.001 1.001865 1.006945

sp77\_704\_8\_pp | .997842 .0059142 -0.36 0.715 .9863174 1.009501

sp77\_704\_9\_pp | .753814 .0068679 -31.02 0.000 .7404727 .7673956

sp77\_704\_pp | .9925657 .0081612 -0.91 0.364 .9766983 1.008691

sp77\_705\_pp | 1.000343 .0014074 0.24 0.807 .9975885 1.003105

sp77\_800\_1\_pp | .9963502 .0048696 -0.75 0.454 .9868515 1.00594

sp77\_800\_2\_pp | .9985559 .0033566 -0.43 0.667 .9919986 1.005156

sp77\_800\_pp | 1.006914 .0047366 1.46 0.143 .9976734 1.016241

sp77\_801\_pp | 1.018102 .010135 1.80 0.072 .9984306 1.038162

sp77\_802\_pp | .9815068 .0067278 -2.72 0.006 .9684088 .9947819

sp77\_803\_pp | 1.001227 .0057315 0.21 0.830 .9900565 1.012524

sp77\_804\_pp | 1.04448 .0203118 2.24 0.025 1.005419 1.085059

sp77\_805\_pp | 1.000501 .0024151 0.21 0.836 .9957789 1.005246

sp77\_807\_1\_pp | .9947355 .0058441 -0.90 0.369 .983347 1.006256

sp77\_807\_2\_pp | .9959395 .0045912 -0.88 0.377 .9869813 1.004979

sp77\_807\_3\_pp | 1.003533 .0008715 4.06 0.000 1.001826 1.005242

sp77\_807\_pp | 1.000602 .0040285 0.15 0.881 .992737 1.008529

sp77\_808\_pp | .9954735 .0107801 -0.42 0.675 .9745675 1.016828

sp77\_809\_pp | .997328 .0012204 -2.19 0.029 .9949388 .9997228

sp77\_810\_pp | 1.007435 .0019762 3.78 0.000 1.003569 1.011315

sp77\_900\_1\_pp | 1.008805 .0063254 1.40 0.162 .9964828 1.021279

sp77\_900\_2\_pp | .9981442 .0025314 -0.73 0.464 .9931951 1.003118

sp77\_900\_pp | .9964387 .0036379 -0.98 0.328 .9893341 1.003594

sp77\_901\_1\_pp | .7483627 .0114796 -18.90 0.000 .726198 .771204

sp77\_901\_pp | 1.002508 .0028769 0.87 0.383 .9968856 1.008163

sp77\_902\_2\_pp | .8563773 .0100116 -13.26 0.000 .836978 .8762262

sp77\_902\_3\_pp | 1.007346 .0044674 1.65 0.099 .9986276 1.01614

sp77\_902\_pp | 1.00186 .0027971 0.67 0.506 .9963932 1.007358

sp77\_903\_pp | .9914343 .0078608 -1.08 0.278 .9761464 1.006962

sp77\_904\_pp | .9998464 .0007914 -0.19 0.846 .9982964 1.001399

mine\_time | .9985865 .0017431 -0.81 0.418 .9951759 1.002009

onsite\_insp\_hours | .9997469 .0001363 -1.86 0.063 .9994799 1.000014

|

state |

AL | 1.107174 .0839615 1.34 0.179 .9542575 1.284594

AR | 2.135199 .122511 13.22 0.000 1.908091 2.389338

CO | .7233524 .1196048 -1.96 0.050 .5231251 1.000217

IL | 1.144136 .0998117 1.54 0.123 .9643196 1.357483

IN | .9030058 .1381853 -0.67 0.505 .6690102 1.218845

MD | 1.077606 .1805404 0.45 0.656 .7759814 1.496474

MT | .8858216 .056804 -1.89 0.059 .7812001 1.004454

NM | .8258647 .0433545 -3.64 0.000 .7451168 .9153632

OH | 1.211686 .1393161 1.67 0.095 .9672112 1.517954

OK | .8813174 .2276594 -0.49 0.625 .531193 1.462219

PA | .9649517 .0901331 -0.38 0.702 .8035216 1.158814

TN | 1.331428 .1809341 2.11 0.035 1.020102 1.737767

UT | .6171095 .0752398 -3.96 0.000 .4859385 .783688

VA | .7000254 .0542152 -4.60 0.000 .6014373 .8147741

WV | 1.022621 .0560734 0.41 0.683 .9184186 1.138646

WY | 1.108191 .0781145 1.46 0.145 .9651944 1.272372

|

time |

2000 | 1.123071 .1193843 1.09 0.275 .9118492 1.38322

2000.25 | 1.232241 .141692 1.82 0.069 .9835999 1.543736

2000.5 | 1.448773 .1391497 3.86 0.000 1.200177 1.748862

2000.75 | 1.093701 .1170385 0.84 0.403 .8867682 1.348922

2001 | 1.097042 .1054593 0.96 0.335 .9086498 1.324493

2001.5 | 1.279271 .1331412 2.37 0.018 1.043213 1.568744

2001.75 | 1.029942 .100245 0.30 0.762 .8510688 1.24641

2002 | 1.101497 .1182176 0.90 0.368 .892542 1.359372

2002.25 | .991809 .1103974 -0.07 0.941 .7974098 1.2336

2002.5 | 1.208522 .123392 1.85 0.064 .9893398 1.476262

2002.75 | 1.105509 .1153613 0.96 0.336 .901028 1.356395

2003 | .9183422 .1005913 -0.78 0.437 .7409136 1.13826

2003.25 | 1.001417 .1075951 0.01 0.989 .8112591 1.236148

2003.5 | 1.1165 .1258983 0.98 0.328 .8951091 1.392649

2003.75 | .8487256 .093245 -1.49 0.135 .6843059 1.052651

2004 | 1.042629 .1160643 0.38 0.708 .8382526 1.296834

2004.25 | .9932648 .109598 -0.06 0.951 .8000966 1.23307

2004.5 | 1.019758 .1122446 0.18 0.859 .8218742 1.265286

2004.75 | .9039203 .0955297 -0.96 0.339 .7348047 1.111958

2005 | .7786984 .0798044 -2.44 0.015 .6369928 .951928

2005.25 | 1.007914 .0988922 0.08 0.936 .8315863 1.22163

2005.5 | .9030499 .1051406 -0.88 0.381 .7187995 1.134529

2005.75 | .8084895 .0881418 -1.95 0.051 .6529443 1.001089

2006 | .8407769 .0887952 -1.64 0.101 .6835725 1.034134

2006.25 | .8442203 .0993991 -1.44 0.150 .6702468 1.063351

2006.5 | .9579256 .1039791 -0.40 0.692 .7743498 1.185022

2006.75 | .7580122 .0856779 -2.45 0.014 .6073865 .9459915

2007 | .8085544 .0874593 -1.96 0.049 .6540891 .9994972

2007.25 | .6855762 .0906371 -2.86 0.004 .5290808 .8883609

2007.5 | .754887 .0885829 -2.40 0.017 .5997868 .9500949

2007.75 | .7690692 .0969632 -2.08 0.037 .6006854 .9846542

2008 | .6613646 .0796131 -3.43 0.001 .5223672 .8373481

2008.25 | .649922 .0771121 -3.63 0.000 .5150717 .8200773

2008.5 | .7605076 .0930697 -2.24 0.025 .5983218 .9666567

2008.75 | .6233139 .0760859 -3.87 0.000 .4906857 .7917903

2009 | .6296964 .0813794 -3.58 0.000 .4887934 .811217

2009.25 | .5652832 .0666975 -4.83 0.000 .448573 .7123592

2009.5 | .7107636 .0868248 -2.79 0.005 .5594289 .9030369

2009.75 | .5233466 .0616409 -5.50 0.000 .4154637 .6592434

2010 | .574503 .0728528 -4.37 0.000 .4480755 .7366028

2010.25 | .6036658 .075085 -4.06 0.000 .473067 .7703189

2010.5 | .6804156 .0820833 -3.19 0.001 .5371404 .8619076

2010.75 | .5450693 .0688411 -4.80 0.000 .4255463 .6981626

2011 | .6062159 .0753635 -4.03 0.000 .4751248 .7734763

2011.25 | .6053757 .0734284 -4.14 0.000 .4772869 .7678396

2011.5 | .6980963 .08774 -2.86 0.004 .5456728 .8930964

2011.75 | .5795674 .0713616 -4.43 0.000 .4552986 .737754

2012 | .7145332 .0868089 -2.77 0.006 .5631312 .9066407

2012.25 | .5898475 .0727589 -4.28 0.000 .463172 .7511682

2012.5 | .6616187 .0820915 -3.33 0.001 .5187922 .8437663

2012.75 | .5581687 .0717461 -4.54 0.000 .4338637 .7180878

2013 | .5999797 .0765196 -4.01 0.000 .4672796 .7703645

2013.25 | .4949294 .0698207 -4.99 0.000 .3753726 .6525652

2013.5 | .6718663 .0911885 -2.93 0.003 .5149371 .8766203

2013.75 | .5605585 .0735668 -4.41 0.000 .4334217 .7249887

2014 | .5233319 .0755612 -4.48 0.000 .3943453 .6945089

2014.25 | .5432991 .0748821 -4.43 0.000 .4146858 .7118013

2014.5 | .5573886 .0754928 -4.32 0.000 .4274361 .7268504

2014.75 | .5726895 .0758454 -4.21 0.000 .4417621 .7424206

2015 | .5573126 .0766095 -4.25 0.000 .4256873 .7296374

2015.25 | .5738752 .0836187 -3.81 0.000 .4313104 .7635633

2015.5 | .735024 .101993 -2.22 0.027 .5599993 .9647517

2015.75 | .4520763 .0723033 -4.96 0.000 .3304258 .618514

2016 | .6045596 .0906166 -3.36 0.001 .450665 .8110068

|

\_cons | .0000147 1.26e-06 -129.73 0.000 .0000124 .0000173

ln(hours) | 1 (exposure)

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

**. estat gof**

Deviance goodness-of-fit = 21809.37

Prob > chi2(27962) = 1.0000

Pearson goodness-of-fit = 351978.6

Prob > chi2(27962) = 0.0000

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

Iteration 0: log pseudolikelihood = -19920.499

Iteration 1: log pseudolikelihood = -19636.803

Iteration 2: log pseudolikelihood = -19635.242

Iteration 3: log pseudolikelihood = -19634.88

Iteration 4: log pseudolikelihood = -19634.776

Iteration 5: log pseudolikelihood = -19634.752

Iteration 6: log pseudolikelihood = -19634.747

Iteration 7: log pseudolikelihood = -19634.745

Iteration 8: log pseudolikelihood = -19634.745

Iteration 9: log pseudolikelihood = -19634.745

Iteration 10: log pseudolikelihood = -19634.745

Generalized linear models No. of obs = 28,337

Optimization : ML Residual df = 27,943

Scale parameter = 1

Deviance = 14986.35292 (1/df) Deviance = .5363187

Pearson = 315204.3832 (1/df) Pearson = 11.28026

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

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

AIC = 1.413611

Log pseudolikelihood = -19634.74509 BIC = -271483.1

(Std. Err. adjusted for 1,544 clusters in mineid)

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| Robust

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

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

sp47\_41\_pp | 1.001096 .0009783 1.12 0.263 .9991798 1.003015

sp47\_42\_pp | .9928337 .0038996 -1.83 0.067 .9852201 1.000506

sp47\_44\_pp | .9970591 .0022041 -1.33 0.183 .9927484 1.001388

sp48\_11\_pp | 1.001503 .0012791 1.18 0.240 .998999 1.004013

sp48\_24\_pp | .9542861 .0027385 -16.31 0.000 .9489338 .9596686

sp48\_25\_pp | .9985659 .0026679 -0.54 0.591 .9933507 1.003809

sp48\_26\_pp | 1.004291 .0015038 2.86 0.004 1.001348 1.007243

sp48\_27\_pp | 1.00057 .0013915 0.41 0.682 .9978464 1.003301

sp48\_28\_pp | 1.003036 .0027879 1.09 0.275 .9975863 1.008515

sp48\_4\_pp | 1.014717 .0015763 9.40 0.000 1.011633 1.017812

sp48\_5\_pp | 1.001707 .0027752 0.62 0.538 .9962823 1.007161

sp48\_6\_pp | 1.000918 .0012233 0.75 0.453 .9985231 1.003318

sp48\_7\_pp | 1.000176 .0011406 0.15 0.878 .9979425 1.002414

sp48\_8\_pp | 1.003314 .0019895 1.67 0.095 .9994227 1.007221

sp71\_701\_pp | .8615518 .0124101 -10.35 0.000 .8375685 .8862218

sp72\_503\_pp | .9975301 .001434 -1.72 0.085 .9947234 1.000345

sp72\_610\_pp | 1.001669 .004036 0.41 0.679 .9937896 1.009611

sp72\_620\_pp | 1.004895 .006732 0.73 0.466 .9917863 1.018176

sp72\_630\_pp | 1.00028 .0001929 1.45 0.147 .999902 1.000658

sp75\_100\_pp | 1.00181 .0039541 0.46 0.647 .9940902 1.00959

sp75\_1001\_1\_pp | .9997315 .0036311 -0.07 0.941 .9926399 1.006874

sp75\_1001\_pp | 1.004247 .007252 0.59 0.557 .9901336 1.018562

sp75\_1003\_1\_pp | .9952508 .0029932 -1.58 0.113 .9894015 1.001135

sp75\_1100\_2\_pp | 1.000584 .0001942 3.01 0.003 1.000204 1.000965

sp75\_1101\_20\_pp | .8022589 .0053103 -33.29 0.000 .7919181 .8127347

sp75\_1102\_pp | .9994315 .0013309 -0.43 0.669 .9968265 1.002043

sp75\_1103\_4\_pp | 1.00029 .0003261 0.89 0.373 .9996515 1.00093

sp75\_1104\_pp | 1.000188 .0013178 0.14 0.887 .997608 1.002774

sp75\_1106\_2\_pp | 1.001528 .0008921 1.71 0.087 .999781 1.003278

sp75\_1106\_3\_pp | 1.000584 .0002874 2.03 0.042 1.000021 1.001147

sp75\_1106\_4\_pp | .9991925 .0022147 -0.36 0.715 .9948612 1.003543

sp75\_1106\_5\_pp | 1.000336 .0010512 0.32 0.749 .998278 1.002399

sp75\_1106\_6\_pp | 1.006734 .0079606 0.85 0.396 .9912519 1.022458

sp75\_1106\_pp | 1.000326 .0020361 0.16 0.873 .996343 1.004324

sp75\_1107\_14\_pp | 1.008907 .0047291 1.89 0.059 .9996803 1.018218

sp75\_1400\_1\_pp | .9961767 .0049354 -0.77 0.439 .9865503 1.005897

sp75\_1400\_2\_pp | .9961651 .0034893 -1.10 0.273 .9893496 1.003028

sp75\_1400\_3\_pp | 1.000172 .0013837 0.12 0.901 .997464 1.002888

sp75\_1400\_4\_pp | .9951957 .0036085 -1.33 0.184 .9881482 1.002293

sp75\_1400\_pp | .9970659 .0015796 -1.85 0.064 .9939747 1.000167

sp75\_1401\_1\_pp | 1.017769 .01076 1.67 0.096 .996897 1.039078

sp75\_1401\_pp | .9875932 .0112646 -1.09 0.274 .96576 1.00992

sp75\_1403\_10\_pp | 1.000427 .000477 0.90 0.371 .9994924 1.001362

sp75\_1403\_11\_pp | 1.000432 .00419 0.10 0.918 .9922536 1.008678

sp75\_1403\_3\_pp | .9946722 .003463 -1.53 0.125 .987908 1.001483

sp75\_1403\_4\_pp | 1.003404 .0027327 1.25 0.212 .9980624 1.008774

sp75\_1403\_5\_pp | .9994233 .0003828 -1.51 0.132 .9986733 1.000174

sp75\_1403\_6\_pp | 1 .0002503 0.00 0.998 .9995101 1.000491

sp75\_1403\_7\_pp | .9998662 .0011633 -0.11 0.908 .9975889 1.002149

sp75\_1403\_8\_pp | .9997529 .0003198 -0.77 0.440 .9991262 1.00038

sp75\_1403\_9\_pp | .9980997 .000795 -2.39 0.017 .9965428 .9996591

sp75\_1404\_1\_pp | .9889444 .0108053 -1.02 0.309 .9679916 1.010351

sp75\_1404\_pp | 1.009391 .0062277 1.51 0.130 .9972584 1.021671

sp75\_1405\_1\_pp | 1.000267 .0085677 0.03 0.975 .9836151 1.017202

sp75\_1405\_pp | .999153 .0003821 -2.22 0.027 .9984043 .9999022

sp75\_1431\_pp | .6661669 .0157189 -17.22 0.000 .63606 .6976988

sp75\_1432\_pp | .9887736 .0079771 -1.40 0.162 .9732618 1.004533

sp75\_1433\_pp | 1.000907 .0020921 0.43 0.664 .9968151 1.005016

sp75\_1434\_pp | 1.00183 .0022068 0.83 0.407 .9975142 1.006165

sp75\_1435\_pp | .987038 .0068303 -1.89 0.059 .9737411 1.000516

sp75\_1437\_pp | 1.008255 .0079672 1.04 0.298 .9927596 1.023992

sp75\_150\_pp | 1.003617 .0037412 0.97 0.333 .9963115 1.010977

sp75\_151\_pp | 1.004292 .006919 0.62 0.534 .9908225 1.017945

sp75\_153\_pp | 1.001128 .0039228 0.29 0.774 .993469 1.008846

sp75\_156\_pp | 1.009631 .0055284 1.75 0.080 .9988539 1.020525

sp75\_160\_pp | 1.001788 .0112303 0.16 0.873 .980017 1.024043

sp75\_1600\_2\_pp | .9990244 .0005628 -1.73 0.083 .997922 1.000128

sp75\_1712\_10\_pp | .9973905 .0014234 -1.83 0.067 .9946045 1.000184

sp75\_1712\_6\_pp | 1.000107 .0010857 0.10 0.922 .9979808 1.002237

sp75\_1720\_pp | .9992557 .000799 -0.93 0.352 .9976909 1.000823

sp75\_1721\_pp | .6252568 .0185554 -15.82 0.000 .5899263 .6627032

sp75\_1725\_pp | 1.000109 .0001149 0.95 0.344 .9998834 1.000334

sp75\_1726\_pp | 1.001961 .0019913 0.99 0.324 .9980652 1.005871

sp75\_1727\_pp | .5995801 .0169495 -18.09 0.000 .5672633 .6337381

sp75\_1728\_pp | 1.008505 .0050486 1.69 0.091 .9986583 1.018449

sp75\_1729\_pp | .9911577 .002765 -3.18 0.001 .9857533 .9965917

sp75\_1730\_pp | .9962885 .0028829 -1.29 0.199 .990654 1.001955

sp75\_1731\_pp | .999907 .0000854 -1.09 0.276 .9997396 1.000074

sp75\_1903\_pp | .9997442 .0009726 -0.26 0.793 .9978398 1.001652

sp75\_1909\_pp | 1.00043 .0001805 2.38 0.017 1.000076 1.000783

sp75\_1910\_pp | 1.000061 .0002691 0.23 0.822 .9995334 1.000588

sp75\_1911\_pp | .9998626 .0003521 -0.39 0.696 .9991727 1.000553

sp75\_1912\_pp | .9987532 .0019573 -0.64 0.524 .9949244 1.002597

sp75\_1913\_pp | 1.004146 .0042238 0.98 0.325 .9959013 1.012459

sp75\_1914\_pp | 1.000087 .0002254 0.39 0.698 .9996456 1.000529

sp75\_1915\_pp | 1.000581 .0027506 0.21 0.833 .9952049 1.005987

sp75\_202\_pp | 1.000092 .0000685 1.35 0.178 .9999581 1.000227

sp75\_208\_pp | .9999908 .0004127 -0.02 0.982 .9991824 1.0008

sp75\_211\_pp | .9998673 .0003903 -0.34 0.734 .9991027 1.000633

sp75\_212\_pp | .9986254 .0008412 -1.63 0.102 .996978 1.000275

sp75\_214\_pp | 1.000102 .0009688 0.11 0.916 .9982049 1.002002

sp75\_312\_pp | 1.000367 .0010317 0.36 0.722 .998347 1.002391

sp75\_320\_pp | .9995224 .0004409 -1.08 0.279 .9986585 1.000387

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sp75\_337\_pp | 1.000735 .0005513 1.33 0.182 .999655 1.001816

sp75\_340\_pp | 1.000266 .0002773 0.96 0.337 .999723 1.00081

sp75\_341\_pp | .9872074 .0113209 -1.12 0.262 .9652664 1.009647

sp75\_342\_pp | 1.000131 .0001825 0.72 0.473 .9997734 1.000489

sp75\_344\_pp | 1.000497 .0021225 0.23 0.815 .9963457 1.004666

sp75\_352\_pp | .997078 .0013658 -2.14 0.033 .9944047 .9997585

sp75\_382\_pp | .9962868 .0013423 -2.76 0.006 .9936593 .9989211

sp75\_503\_pp | 1.000068 .0000906 0.75 0.454 .9998904 1.000245

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sp75\_505\_pp | .9979098 .0055434 -0.38 0.706 .987104 1.008834

sp75\_506\_1\_pp | 1.003372 .0022257 1.52 0.129 .9990196 1.007744

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AR | 2.065174 .1153652 12.98 0.000 1.851001 2.304128

CO | .7861394 .1294242 -1.46 0.144 .56933 1.085513

IL | 1.167672 .090278 2.00 0.045 1.003484 1.358723

IN | .9395752 .1439689 -0.41 0.684 .6958313 1.268701

MD | 1.11932 .1902085 0.66 0.507 .8022458 1.561711

MT | .9132623 .0732167 -1.13 0.258 .7804665 1.068653

NM | .8903139 .0472351 -2.19 0.029 .8023856 .9878777

OH | 1.097441 .1517355 0.67 0.501 .8369348 1.439034

OK | .9067636 .2486633 -0.36 0.721 .5297459 1.552103

PA | 1.068394 .0873223 0.81 0.418 .9102503 1.254013

TN | 1.436669 .1998694 2.60 0.009 1.093799 1.887017

UT | .6555305 .0836521 -3.31 0.001 .5104713 .8418108

VA | .7455467 .0499047 -4.39 0.000 .6538797 .8500644

WV | 1.126578 .0545191 2.46 0.014 1.024634 1.238665

WY | 1.190191 .0767948 2.70 0.007 1.048804 1.350638

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time |

2000 | 1.052764 .1243406 0.44 0.663 .8352117 1.326983

2000.25 | 1.098952 .1279433 0.81 0.418 .8747405 1.380633

2000.5 | 1.395681 .1580176 2.94 0.003 1.117929 1.742442

2000.75 | 1.001622 .1186242 0.01 0.989 .7941348 1.26332

2001 | 1.002326 .112964 0.02 0.984 .8036686 1.250089

2001.5 | 1.166644 .1322124 1.36 0.174 .9342735 1.456809

2001.75 | .9974287 .1096974 -0.02 0.981 .8040195 1.237363

2002 | 1.006066 .1219999 0.05 0.960 .7932431 1.275989

2002.25 | .9109982 .1065095 -0.80 0.425 .7244345 1.145608

2002.5 | 1.136856 .132645 1.10 0.272 .904461 1.428963

2002.75 | 1.069165 .1296682 0.55 0.581 .8429676 1.356058

2003 | .8933384 .1110405 -0.91 0.364 .7001854 1.139775

2003.25 | .961312 .1240557 -0.31 0.760 .7464801 1.237971

2003.5 | 1.05874 .1310635 0.46 0.645 .8306488 1.349464

2003.75 | .7338179 .0897455 -2.53 0.011 .5774134 .9325878

2004 | .9971675 .1260353 -0.02 0.982 .7783626 1.277481

2004.25 | .8914255 .1084357 -0.94 0.345 .7023318 1.13143

2004.5 | .9336079 .1168778 -0.55 0.583 .7304713 1.193235

2004.75 | .8181649 .0993188 -1.65 0.098 .6449286 1.037935

2005 | .7180162 .0888738 -2.68 0.007 .5633459 .9151521

2005.25 | .9448475 .1054515 -0.51 0.611 .7592097 1.175876

2005.5 | .7827979 .0964633 -1.99 0.047 .6148328 .996649

2005.75 | .7519129 .0977002 -2.19 0.028 .5828627 .9699936

2006 | .8109692 .0967601 -1.76 0.079 .6418655 1.024624

2006.25 | .8182892 .1062044 -1.55 0.122 .6344987 1.055317

2006.5 | .8862864 .10664 -1.00 0.316 .7000927 1.121999

2006.75 | .7080912 .088547 -2.76 0.006 .5541741 .9047575

2007 | .7232011 .0889931 -2.63 0.008 .5682179 .9204564

2007.25 | .6333032 .0854826 -3.38 0.001 .4860908 .8250989

2007.5 | .7198414 .0934332 -2.53 0.011 .5581533 .9283679

2007.75 | .6934612 .0921163 -2.76 0.006 .5345057 .899688

2008 | .5857252 .0754843 -4.15 0.000 .4549847 .7540341

2008.25 | .6153899 .0792207 -3.77 0.000 .4781597 .7920047

2008.5 | .6799016 .0893858 -2.93 0.003 .52546 .8797362

2008.75 | .5563416 .0740088 -4.41 0.000 .4286552 .7220627

2009 | .5307263 .0692046 -4.86 0.000 .4110336 .6852734

2009.25 | .5176936 .0688999 -4.95 0.000 .3988285 .6719846

2009.5 | .6186942 .0828192 -3.59 0.000 .4759192 .8043016

2009.75 | .4714424 .0629519 -5.63 0.000 .3628836 .6124773

2010 | .5090141 .0713178 -4.82 0.000 .3867838 .6698715

2010.25 | .5452407 .0698852 -4.73 0.000 .4241184 .7009538

2010.5 | .6813514 .0930742 -2.81 0.005 .5213088 .8905273

2010.75 | .5078059 .0695043 -4.95 0.000 .3883222 .6640537

2011 | .6085263 .0807183 -3.74 0.000 .4692142 .7892007

2011.25 | .576495 .0751606 -4.22 0.000 .4464985 .7443395

2011.5 | .6533812 .0846494 -3.29 0.001 .5068605 .8422575

2011.75 | .5212767 .0709729 -4.78 0.000 .3991861 .6807085

2012 | .63638 .0803183 -3.58 0.000 .4969188 .8149814

2012.25 | .5408067 .0713789 -4.66 0.000 .4175373 .7004688

2012.5 | .6424982 .088238 -3.22 0.001 .4908756 .8409542

2012.75 | .4850416 .065822 -5.33 0.000 .3717643 .6328347

2013 | .5155844 .0704271 -4.85 0.000 .3944832 .6738621

2013.25 | .4290652 .0626953 -5.79 0.000 .3222145 .571349

2013.5 | .5609962 .077785 -4.17 0.000 .4275003 .7361789

2013.75 | .5062863 .0722064 -4.77 0.000 .382823 .6695675

2014 | .4356164 .0636291 -5.69 0.000 .3271688 .5800113

2014.25 | .4808778 .0690055 -5.10 0.000 .3629846 .6370615

2014.5 | .4976598 .0707546 -4.91 0.000 .3766286 .6575849

2014.75 | .5003723 .0715256 -4.84 0.000 .3781103 .6621678

2015 | .5050875 .0735595 -4.69 0.000 .3796646 .6719442

2015.25 | .5312871 .0823294 -4.08 0.000 .3921256 .7198357

2015.5 | .6743576 .095305 -2.79 0.005 .5112019 .8895862

2015.75 | .4061172 .0654434 -5.59 0.000 .296132 .5569515

2016 | .5436026 .0851805 -3.89 0.000 .399854 .7390293

|

\_cons | .0000151 1.40e-06 -119.91 0.000 .0000126 .0000182

ln(hours) | 1 (exposure)

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

**. eststo: nbreg MR `subpart\_penalty\_point\_vars' `covariates' ib(freq).state ib(freq).time if sample\_pp == 1, vce(cl mineid) exposure(hours) iter(50) irr**

note: sp75\_1001\_pp omitted because of collinearity

note: sp75\_1106\_6\_pp omitted because of collinearity

note: sp75\_1431\_pp omitted because of collinearity

note: sp75\_511\_1\_pp omitted because of collinearity

note: sp77\_413\_pp omitted because of collinearity

note: sp77\_606\_pp omitted because of collinearity

note: sp77\_804\_pp omitted because of collinearity

Fitting Poisson model:

Iteration 0: log pseudolikelihood = -38578.585

Iteration 1: log pseudolikelihood = -20367.527

Iteration 2: log pseudolikelihood = -15370.908

Iteration 3: log pseudolikelihood = -10408.744

Iteration 4: log pseudolikelihood = -9883.8712

Iteration 5: log pseudolikelihood = -9807.0574

Iteration 6: log pseudolikelihood = -9800.1799

Iteration 7: log pseudolikelihood = -9800.0286

Iteration 8: log pseudolikelihood = -9800.0283

Iteration 9: log pseudolikelihood = -9800.0283

Iteration 10: log pseudolikelihood = -9800.0283

Fitting constant-only model:

Iteration 0: log pseudolikelihood = -10314.872

Iteration 1: log pseudolikelihood = -10136.883

Iteration 2: log pseudolikelihood = -10132.52

Iteration 3: log pseudolikelihood = -10132.509

Iteration 4: log pseudolikelihood = -10132.509

Fitting full model:

Iteration 0: log pseudolikelihood = -9835.1006

Iteration 1: log pseudolikelihood = -9787.5184

Iteration 2: log pseudolikelihood = -9784.0694

Iteration 3: log pseudolikelihood = -9783.9231

Iteration 4: log pseudolikelihood = -9783.9224

Negative binomial regression Number of obs = 14,895

Wald chi2(347) = .

Dispersion = mean Prob > chi2 = .

Log pseudolikelihood = -9783.9224 Pseudo R2 = 0.0344

(Std. Err. adjusted for 879 clusters in mineid)

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| Robust

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

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

sp47\_41\_pp | 1.001419 .0009881 1.44 0.151 .9994843 1.003358

sp47\_42\_pp | .9956081 .0033797 -1.30 0.195 .989006 1.002254

sp47\_44\_pp | .997333 .0020839 -1.28 0.201 .9932571 1.001426

sp48\_11\_pp | 1.000731 .0013012 0.56 0.574 .9981839 1.003285

sp48\_24\_pp | .9372868 .0026887 -22.58 0.000 .9320318 .9425715

sp48\_25\_pp | 1.0023 .0023381 0.98 0.325 .9977282 1.006893

sp48\_26\_pp | 1.00289 .0014769 1.96 0.050 .999999 1.005788

sp48\_27\_pp | 1.000781 .0012201 0.64 0.522 .9983927 1.003175

sp48\_28\_pp | 1.003768 .0021852 1.73 0.084 .999494 1.00806

sp48\_4\_pp | 1.015433 .0015686 9.91 0.000 1.012364 1.018512

sp48\_5\_pp | .9997391 .0040163 -0.06 0.948 .9918981 1.007642

sp48\_6\_pp | 1.001665 .0011667 1.43 0.153 .9993807 1.003954

sp48\_7\_pp | .9991391 .0009184 -0.94 0.349 .9973408 1.000941

sp48\_8\_pp | 1.004144 .0019024 2.18 0.029 1.000422 1.00788

sp71\_701\_pp | .8140337 .011489 -14.58 0.000 .7918242 .836866

sp72\_503\_pp | .9975187 .0014432 -1.72 0.086 .9946941 1.000351

sp72\_610\_pp | 1.00251 .0038458 0.65 0.513 .9950005 1.010076

sp72\_620\_pp | 1.00412 .0065095 0.63 0.526 .9914427 1.01696

sp72\_630\_pp | 1.00022 .0001865 1.18 0.238 .9998548 1.000586

sp75\_100\_pp | 1.003536 .0033614 1.05 0.292 .996969 1.010146

sp75\_1001\_1\_pp | .9989607 .0020628 -0.50 0.615 .9949257 1.003012

sp75\_1001\_pp | 1 (omitted)

sp75\_1003\_1\_pp | .9968962 .0032168 -0.96 0.335 .9906112 1.003221

sp75\_1100\_2\_pp | 1.000621 .0001833 3.39 0.001 1.000262 1.00098

sp75\_1101\_20\_pp | .7431607 .0061439 -35.91 0.000 .7312158 .7553007

sp75\_1102\_pp | .9990673 .0012429 -0.75 0.453 .9966343 1.001506

sp75\_1103\_4\_pp | 1.000376 .0003201 1.18 0.239 .9997493 1.001004

sp75\_1104\_pp | .9999816 .0012689 -0.01 0.988 .9974976 1.002472

sp75\_1106\_2\_pp | 1.001268 .0008779 1.44 0.148 .9995485 1.00299

sp75\_1106\_3\_pp | 1.00078 .0002913 2.68 0.007 1.000209 1.001351

sp75\_1106\_4\_pp | .9970539 .0019621 -1.50 0.134 .9932157 1.000907

sp75\_1106\_5\_pp | 1.000059 .000994 0.06 0.953 .9981126 1.002009

sp75\_1106\_6\_pp | 1 (omitted)

sp75\_1106\_pp | .9997051 .0017887 -0.16 0.869 .9962055 1.003217

sp75\_1107\_14\_pp | 1.009827 .0037961 2.60 0.009 1.002414 1.017294

sp75\_1400\_1\_pp | .9953526 .0055576 -0.83 0.404 .9845194 1.006305

sp75\_1400\_2\_pp | .9967259 .0036231 -0.90 0.367 .98965 1.003852

sp75\_1400\_3\_pp | 1.000193 .0016624 0.12 0.907 .9969402 1.003457

sp75\_1400\_4\_pp | .9953358 .0034422 -1.35 0.176 .988612 1.002105

sp75\_1400\_pp | .9968455 .0014845 -2.12 0.034 .9939402 .9997593

sp75\_1401\_1\_pp | 1.023219 .009295 2.53 0.012 1.005162 1.0416

sp75\_1401\_pp | .9920986 .0115213 -0.68 0.495 .9697724 1.014939

sp75\_1403\_10\_pp | .9999007 .0004033 -0.25 0.806 .9991105 1.000692

sp75\_1403\_11\_pp | 1.001667 .0032491 0.51 0.608 .9953187 1.008055

sp75\_1403\_3\_pp | .9980057 .0033483 -0.60 0.552 .9914646 1.00459

sp75\_1403\_4\_pp | 1.001249 .0045245 0.28 0.782 .9924199 1.010156

sp75\_1403\_5\_pp | .9997147 .0002831 -1.01 0.314 .9991599 1.00027

sp75\_1403\_6\_pp | .999751 .0002394 -1.04 0.298 .999282 1.00022

sp75\_1403\_7\_pp | .9997527 .0009982 -0.25 0.804 .9977983 1.001711

sp75\_1403\_8\_pp | .9997018 .0003279 -0.91 0.363 .9990594 1.000345

sp75\_1403\_9\_pp | .9992814 .0007125 -1.01 0.313 .9978859 1.000679

sp75\_1404\_1\_pp | .9901298 .0072084 -1.36 0.173 .976102 1.004359

sp75\_1404\_pp | 1.008914 .0058612 1.53 0.127 .9974919 1.020468

sp75\_1405\_1\_pp | 1.000186 .0048307 0.04 0.969 .9907623 1.009699

sp75\_1405\_pp | .9991999 .000393 -2.03 0.042 .99843 .9999705

sp75\_1431\_pp | 1 (omitted)

sp75\_1432\_pp | .987223 .0061226 -2.07 0.038 .9752956 .9992963

sp75\_1433\_pp | 1.002216 .0018248 1.22 0.224 .9986461 1.005799

sp75\_1434\_pp | .9994355 .0027945 -0.20 0.840 .9939733 1.004928

sp75\_1435\_pp | .9980138 .0061018 -0.33 0.745 .9861259 1.010045

sp75\_1437\_pp | 1.001957 .0057182 0.34 0.732 .9908122 1.013227

sp75\_150\_pp | 1.004046 .0025187 1.61 0.107 .9991215 1.008995

sp75\_151\_pp | 1.003099 .0070369 0.44 0.659 .989401 1.016986

sp75\_153\_pp | 1.003936 .0030983 1.27 0.203 .9978814 1.010027

sp75\_156\_pp | 1.006641 .0054602 1.22 0.222 .9959957 1.0174

sp75\_160\_pp | 1.006942 .0129582 0.54 0.591 .9818619 1.032663

sp75\_1600\_2\_pp | .9991069 .0004669 -1.91 0.056 .9981922 1.000022

sp75\_1712\_10\_pp | .9978807 .0014288 -1.48 0.138 .9950843 1.000685

sp75\_1712\_6\_pp | 1.000235 .0010224 0.23 0.818 .9982333 1.002241

sp75\_1720\_pp | .9992312 .000759 -1.01 0.311 .9977448 1.00072

sp75\_1721\_pp | .5025248 .0196812 -17.57 0.000 .4653937 .5426184

sp75\_1725\_pp | 1.000108 .0001122 0.96 0.335 .9998883 1.000328

sp75\_1726\_pp | 1.00073 .0014734 0.50 0.620 .9978468 1.003622

sp75\_1727\_pp | .6070572 .0138856 -21.82 0.000 .5804429 .6348917

sp75\_1728\_pp | 1.005916 .0034193 1.74 0.083 .9992364 1.01264

sp75\_1729\_pp | .9911787 .0029496 -2.98 0.003 .9854143 .9969767

sp75\_1730\_pp | .9988107 .0027932 -0.43 0.670 .993351 1.0043

sp75\_1731\_pp | .9999998 .0000761 -0.00 0.997 .9998506 1.000149

sp75\_1903\_pp | .9993242 .0010312 -0.66 0.512 .9973051 1.001347

sp75\_1909\_pp | 1.000371 .000177 2.10 0.036 1.000024 1.000718

sp75\_1910\_pp | .9999208 .0002568 -0.31 0.758 .9994176 1.000424

sp75\_1911\_pp | .9998716 .0003335 -0.38 0.700 .9992182 1.000525

sp75\_1912\_pp | .9982342 .0015808 -1.12 0.264 .9951406 1.001337

sp75\_1913\_pp | 1.001761 .0041452 0.43 0.671 .9936692 1.009918

sp75\_1914\_pp | 1.000108 .0002166 0.50 0.618 .9996836 1.000532

sp75\_1915\_pp | .9999411 .0026339 -0.02 0.982 .994792 1.005117

sp75\_202\_pp | 1.000068 .0000573 1.19 0.234 .9999558 1.000181

sp75\_208\_pp | 1.000023 .0004097 0.06 0.955 .9992201 1.000826

sp75\_211\_pp | .9999744 .0003957 -0.06 0.948 .9991992 1.00075

sp75\_212\_pp | .9987058 .0007937 -1.63 0.103 .9971514 1.000263

sp75\_214\_pp | .9998722 .0009217 -0.14 0.890 .9980674 1.00168

sp75\_312\_pp | 1.000164 .0009515 0.17 0.863 .9983005 1.00203

sp75\_320\_pp | .9996281 .0004188 -0.89 0.375 .9988076 1.000449

sp75\_324\_pp | 1.000406 .0014436 0.28 0.779 .9975802 1.003239

sp75\_337\_pp | 1.000784 .0005017 1.56 0.118 .9998012 1.001768

sp75\_340\_pp | 1.000213 .0002739 0.78 0.436 .9996766 1.00075

sp75\_341\_pp | .9838483 .0123186 -1.30 0.193 .9599981 1.008291

sp75\_342\_pp | 1.000208 .0001842 1.13 0.259 .9998468 1.000569

sp75\_344\_pp | .9981164 .0019298 -0.98 0.329 .9943412 1.001906

sp75\_352\_pp | .9975601 .0013011 -1.87 0.061 .9950133 1.000113

sp75\_382\_pp | .9955984 .0013418 -3.27 0.001 .9929721 .9982317

sp75\_503\_pp | 1.000056 .0000908 0.62 0.537 .9998781 1.000234

sp75\_504\_pp | .9988825 .0023113 -0.48 0.629 .9943628 1.003423

sp75\_505\_pp | .9982608 .0047317 -0.37 0.713 .9890298 1.007578

sp75\_506\_1\_pp | 1.00211 .0019543 1.08 0.280 .998287 1.005948

sp75\_506\_pp | .9971892 .0018784 -1.49 0.135 .9935143 1.000878

sp75\_507\_pp | .9995955 .0008639 -0.47 0.640 .9979036 1.00129

sp75\_511\_1\_pp | 1 (omitted)

sp75\_511\_pp | 1.001663 .000975 1.71 0.088 .9997534 1.003575

sp75\_512\_1\_pp | .9973189 .0160074 -0.17 0.867 .9664333 1.029192

sp75\_512\_2\_pp | 1.00062 .0003676 1.69 0.092 .9998998 1.001341

sp75\_512\_pp | .9999264 .0001172 -0.63 0.530 .9996967 1.000156

sp75\_513\_1\_pp | 1.00065 .0018952 0.34 0.732 .996942 1.004371

sp75\_513\_pp | .9946953 .0023622 -2.24 0.025 .9900762 .9993359

sp75\_514\_pp | 1.000587 .0004129 1.42 0.155 .9997778 1.001396

sp75\_515\_pp | .9992656 .0002395 -3.06 0.002 .9987962 .9997352

sp75\_516\_1\_pp | .9995652 .0020274 -0.21 0.830 .9955996 1.003547

sp75\_516\_2\_pp | 1.000915 .0006192 1.48 0.139 .9997022 1.002129

sp75\_516\_pp | .9999876 .0003882 -0.03 0.974 .9992269 1.000749

sp75\_517\_1\_pp | 1.009546 .0034205 2.80 0.005 1.002865 1.016273

sp75\_517\_pp | .9999205 .0000875 -0.91 0.364 .999749 1.000092

sp75\_518\_1\_pp | 1.00054 .0004854 1.11 0.266 .9995889 1.001492

sp75\_518\_pp | 1.000371 .0003506 1.06 0.290 .9996837 1.001058

sp75\_519\_pp | .9911974 .0026997 -3.25 0.001 .9859202 .9965028

sp75\_520\_pp | 1.000422 .0006777 0.62 0.533 .9990945 1.001751

sp75\_523\_1\_pp | .998643 .0010135 -1.34 0.181 .9966586 1.000631

sp75\_523\_2\_pp | .9988345 .0006079 -1.92 0.055 .9976438 1.000027

sp75\_523\_pp | 1.000764 .0011838 0.65 0.519 .9984463 1.003087

sp75\_600\_1\_pp | .994638 .0038117 -1.40 0.161 .9871953 1.002137

sp75\_600\_pp | .9972857 .0064488 -0.42 0.674 .9847259 1.010006

sp75\_601\_1\_pp | 1.000167 .0002958 0.57 0.571 .9995878 1.000747

sp75\_601\_2\_pp | 1.007534 .0080831 0.94 0.349 .9918154 1.023502

sp75\_601\_3\_pp | .9968881 .0030122 -1.03 0.302 .9910018 1.002809

sp75\_601\_pp | 1.000188 .0003953 0.48 0.634 .9994139 1.000963

sp75\_602\_pp | .9977241 .0013938 -1.63 0.103 .994996 1.00046

sp75\_603\_pp | .9998822 .0009676 -0.12 0.903 .9979874 1.00178

sp75\_604\_pp | 1.000167 .0001408 1.18 0.237 .9998907 1.000443

sp75\_605\_pp | .9999585 .000449 -0.09 0.926 .9990789 1.000839

sp75\_606\_pp | 1.000272 .000267 1.02 0.309 .9997487 1.000795

sp75\_607\_pp | 1.000601 .0012313 0.49 0.625 .9981905 1.003017

sp75\_700\_1\_pp | 1.00361 .0043558 0.83 0.406 .9951092 1.012184

sp75\_700\_pp | .9981192 .0014786 -1.27 0.204 .9952255 1.001021

sp75\_701\_1\_pp | .9977958 .0018122 -1.22 0.224 .9942504 1.001354

sp75\_701\_2\_pp | 1.001237 .001767 0.70 0.484 .9977797 1.004706

sp75\_701\_3\_pp | .998958 .0018054 -0.58 0.564 .9954257 1.002503

sp75\_701\_4\_pp | 1.00598 .0070027 0.86 0.392 .9923481 1.019799

sp75\_701\_5\_pp | .9976702 .0021722 -1.07 0.284 .9934218 1.001937

sp75\_701\_pp | .9999527 .0002888 -0.16 0.870 .9993868 1.000519

sp75\_702\_1\_pp | 1.01034 .0071286 1.46 0.145 .9964645 1.024409

sp75\_702\_pp | 1.005081 .0076681 0.66 0.507 .9901633 1.020223

sp75\_703\_1\_pp | 1.006983 .0084244 0.83 0.406 .9906063 1.023631

sp75\_703\_2\_pp | 1.00534 .0059067 0.91 0.365 .9938297 1.016984

sp75\_703\_3\_pp | .9989923 .0027251 -0.37 0.712 .9936655 1.004348

sp75\_703\_4\_pp | .6424778 .0137834 -20.62 0.000 .6160228 .6700688

sp75\_703\_pp | 1.000876 .0006631 1.32 0.186 .9995774 1.002177

sp75\_704\_pp | .9988445 .0030713 -0.38 0.707 .992843 1.004882

sp75\_705\_1\_pp | .9998977 .0018084 -0.06 0.955 .9963596 1.003448

sp75\_705\_3\_pp | .6161064 .0142545 -20.93 0.000 .588792 .6446878

sp75\_705\_8\_pp | 1.001313 .0068873 0.19 0.849 .9879046 1.014903

sp75\_705\_pp | 1.007896 .0040901 1.94 0.053 .9999113 1.015944

sp75\_706\_pp | .9994315 .0020575 -0.28 0.782 .995407 1.003472

sp75\_800\_2\_pp | .6544813 .0156865 -17.69 0.000 .6244472 .6859599

sp75\_800\_3\_pp | .9976811 .0028934 -0.80 0.423 .9920263 1.003368

sp75\_800\_4\_pp | 1.00422 .0019221 2.20 0.028 1.000459 1.007994

sp75\_800\_pp | 1.000343 .0014411 0.24 0.812 .9975228 1.003172

sp75\_801\_pp | 1.003735 .0043957 0.85 0.395 .9951559 1.012387

sp75\_802\_pp | 1.002576 .0036551 0.71 0.480 .9954379 1.009766

sp75\_803\_2\_pp | 1.014723 .0014976 9.90 0.000 1.011792 1.017663

sp75\_803\_pp | .9992267 .0017691 -0.44 0.662 .9957653 1.0027

sp75\_804\_pp | .9971164 .0028642 -1.01 0.315 .9915184 1.002746

sp75\_805\_pp | 1.001042 .0042669 0.24 0.807 .9927139 1.00944

sp75\_806\_pp | 1.021088 .003413 6.24 0.000 1.01442 1.027799

sp75\_807\_pp | 1.000007 .0002307 0.03 0.977 .9995546 1.000459

sp75\_808\_pp | .9986396 .0019385 -0.70 0.483 .9948474 1.002446

sp75\_809\_pp | .9982493 .000693 -2.52 0.012 .996892 .9996085

sp75\_810\_pp | .999833 .0013204 -0.13 0.899 .9972485 1.002424

sp75\_811\_pp | .9993159 .0009175 -0.75 0.456 .9975192 1.001116

sp75\_812\_pp | 1.003261 .003249 1.01 0.315 .9969137 1.00965

sp75\_814\_pp | 1.001894 .0024147 0.79 0.432 .9971727 1.006638

sp75\_815\_pp | .9981297 .0030594 -0.61 0.541 .9921514 1.004144

sp75\_816\_pp | .9999388 .00067 -0.09 0.927 .9986264 1.001253

sp75\_818\_pp | 1.00353 .0032095 1.10 0.271 .9972591 1.00984

sp75\_820\_pp | 1.002339 .0013454 1.74 0.082 .9997059 1.00498

sp75\_821\_pp | 1.003364 .0013362 2.52 0.012 1.000749 1.005986

sp75\_825\_pp | .9995983 .0019563 -0.21 0.837 .9957714 1.00344

sp75\_827\_pp | 1.001703 .0025653 0.66 0.506 .9966874 1.006743

sp75\_831\_pp | .9983452 .0041484 -0.40 0.690 .9902476 1.006509

sp75\_832\_pp | .9918378 .0111073 -0.73 0.464 .9703051 1.013848

sp75\_834\_pp | .3777199 .0220474 -16.68 0.000 .336888 .4235009

sp75\_900\_2\_pp | .9987356 .0021406 -0.59 0.555 .9945488 1.00294

sp75\_900\_3\_pp | .9980697 .0020239 -0.95 0.341 .9941107 1.002044

sp75\_900\_4\_pp | 1.000999 .0003805 2.63 0.009 1.000254 1.001745

sp75\_900\_pp | 1.000344 .0007732 0.45 0.656 .9988303 1.001861

sp75\_901\_pp | 1.002037 .0020039 1.02 0.309 .9981174 1.005973

sp75\_902\_1\_pp | .998588 .0041276 -0.34 0.732 .9905307 1.006711

sp75\_902\_2\_pp | .999583 .0013189 -0.32 0.752 .9970013 1.002171

sp75\_902\_4\_pp | .9998099 .0011298 -0.17 0.866 .9975981 1.002027

sp75\_902\_pp | 1.000827 .0007955 1.04 0.298 .9992694 1.002387

sp75\_903\_pp | 1.001893 .0008009 2.37 0.018 1.000325 1.003464

sp75\_904\_pp | .9997412 .0002384 -1.09 0.278 .9992742 1.000208

sp75\_905\_pp | 1.001759 .0040354 0.44 0.663 .993881 1.0097

sp75\_907\_pp | .9969359 .0022212 -1.38 0.168 .992592 1.001299

sp77\_103\_pp | .8575862 .0058693 -22.45 0.000 .8461594 .8691673

sp77\_104\_pp | .9977062 .0173597 -0.13 0.895 .9642555 1.032317

sp77\_1103\_pp | .9991437 .0006165 -1.39 0.165 .9979361 1.000353

sp77\_1104\_pp | .9997144 .0002477 -1.15 0.249 .9992291 1.0002

sp77\_1106\_pp | .7135828 .0109171 -22.06 0.000 .6925032 .735304

sp77\_1111\_pp | .9929977 .0066815 -1.04 0.296 .9799882 1.00618

sp77\_1112\_pp | .9968007 .0012927 -2.47 0.013 .9942702 .9993376

sp77\_1403\_pp | 1.001743 .0012862 1.36 0.175 .9992253 1.004267

sp77\_1432\_pp | 1.007254 .0033177 2.19 0.028 1.000773 1.013778

sp77\_1433\_pp | 1.003182 .0049395 0.65 0.519 .993547 1.01291

sp77\_1434\_pp | .9979078 .0019458 -1.07 0.283 .9941015 1.001729

sp77\_1437\_pp | .9958889 .003682 -1.11 0.265 .9886984 1.003132

sp77\_1438\_pp | .5713863 .0196078 -16.31 0.000 .5342197 .6111387

sp77\_1605\_pp | .9998181 .0002939 -0.62 0.536 .9992422 1.000394

sp77\_1606\_pp | 1.000705 .0004177 1.69 0.091 .9998864 1.001524

sp77\_1710\_pp | .9996719 .0006832 -0.48 0.631 .9983338 1.001012

sp77\_1802\_pp | .6520242 .0118199 -23.59 0.000 .6292644 .6756071

sp77\_1906\_pp | .9987163 .0064469 -0.20 0.842 .9861601 1.011432

sp77\_1915\_pp | .9962806 .0028769 -1.29 0.197 .9906579 1.001935

sp77\_1916\_pp | 1.005983 .0026008 2.31 0.021 1.000898 1.011093

sp77\_200\_pp | .9993739 .0004987 -1.26 0.209 .9983969 1.000352

sp77\_202\_pp | .9990364 .0005155 -1.87 0.062 .9980266 1.000047

sp77\_203\_pp | 1.004172 .0029132 1.44 0.151 .9984786 1.009898

sp77\_204\_pp | .9986048 .0007991 -1.74 0.081 .9970398 1.000172

sp77\_205\_pp | 1.000569 .0002732 2.08 0.037 1.000034 1.001105

sp77\_206\_pp | 1.003076 .0009971 3.09 0.002 1.001124 1.005033

sp77\_207\_pp | 1.000737 .0008491 0.87 0.385 .9990743 1.002403

sp77\_208\_pp | 1.000846 .0004463 1.90 0.058 .9999721 1.001722

sp77\_210\_pp | .9982648 .0013439 -1.29 0.197 .9956342 1.000902

sp77\_216\_pp | 1.000151 .0007733 0.19 0.846 .9986361 1.001667

sp77\_305\_pp | 1.010543 .0082871 1.28 0.201 .9944307 1.026917

sp77\_309\_pp | 1.001446 .0033328 0.43 0.664 .9949352 1.008

sp77\_314\_pp | .9876378 .0089755 -1.37 0.171 .9702019 1.005387

sp77\_315\_pp | .9840527 .0089954 -1.76 0.079 .9665791 1.001842

sp77\_400\_pp | 1.000236 .0002885 0.82 0.413 .9996708 1.000802

sp77\_401\_pp | 1.002892 .0016827 1.72 0.085 .9995997 1.006196

sp77\_402\_pp | .9990599 .0013202 -0.71 0.477 .9964757 1.001651

sp77\_403\_1\_pp | .9991202 .0025872 -0.34 0.734 .9940622 1.004204

sp77\_403\_2\_pp | .9986765 .0044736 -0.30 0.767 .9899468 1.007483

sp77\_403\_pp | 1.011055 .0047441 2.34 0.019 1.001799 1.020396

sp77\_404\_pp | .9994874 .0002321 -2.21 0.027 .9990326 .9999424

sp77\_405\_pp | .9992711 .0020433 -0.36 0.721 .9952743 1.003284

sp77\_408\_pp | 1.001122 .0024999 0.45 0.653 .9962345 1.006034

sp77\_409\_pp | .9926143 .0045812 -1.61 0.108 .9836759 1.001634

sp77\_410\_pp | 1.000759 .0004494 1.69 0.091 .9998787 1.00164

sp77\_411\_pp | .9903949 .0106907 -0.89 0.371 .9696615 1.011571

sp77\_412\_pp | 1.001917 .0012907 1.49 0.137 .9993906 1.00445

sp77\_413\_pp | 1 (omitted)

sp77\_500\_pp | 1.001032 .0017231 0.60 0.549 .9976603 1.004415

sp77\_501\_pp | 1.0019 .0024444 0.78 0.437 .9971201 1.006702

sp77\_502\_1\_pp | 1.010805 .0043937 2.47 0.013 1.00223 1.019453

sp77\_502\_2\_pp | 1.000783 .0013895 0.56 0.573 .9980636 1.003511

sp77\_502\_pp | .9997577 .0002443 -0.99 0.321 .999279 1.000237

sp77\_503\_1\_pp | 1.002542 .0046277 0.55 0.582 .9935125 1.011653

sp77\_503\_pp | 1.000482 .0034193 0.14 0.888 .9938026 1.007206

sp77\_504\_pp | .9978227 .0009446 -2.30 0.021 .995973 .9996759

sp77\_505\_pp | 1.00026 .000616 0.42 0.673 .9990534 1.001468

sp77\_506\_1\_pp | .9998612 .0004994 -0.28 0.781 .9988829 1.000841

sp77\_506\_pp | .9960719 .0019018 -2.06 0.039 .9923515 .9998063

sp77\_507\_pp | 1.000123 .0031341 0.04 0.969 .9939994 1.006285

sp77\_508\_1\_pp | 1.005706 .0064579 0.89 0.376 .993128 1.018443

sp77\_508\_pp | .9970012 .0029288 -1.02 0.307 .9912774 1.002758

sp77\_509\_pp | 1.000922 .0010239 0.90 0.368 .9989168 1.00293

sp77\_510\_pp | 1.002451 .0058164 0.42 0.673 .9911155 1.013916

sp77\_511\_pp | .9974056 .0045134 -0.57 0.566 .9885986 1.006291

sp77\_512\_pp | 1.000255 .0004722 0.54 0.590 .9993297 1.001181

sp77\_513\_pp | .999633 .0007189 -0.51 0.610 .9982249 1.001043

sp77\_514\_pp | 1.002558 .0055753 0.46 0.646 .9916898 1.013545

sp77\_515\_pp | .7023105 .0113491 -21.87 0.000 .6804152 .7249103

sp77\_516\_pp | .9993426 .0004062 -1.62 0.106 .9985469 1.000139

sp77\_600\_pp | .9979076 .0043233 -0.48 0.629 .98947 1.006417

sp77\_601\_pp | 1.003929 .0046965 0.84 0.402 .9947656 1.013176

sp77\_602\_pp | .9959155 .0052683 -0.77 0.439 .985643 1.006295

sp77\_603\_pp | 1.012487 .0071825 1.75 0.080 .998507 1.026663

sp77\_604\_pp | .9990496 .0039888 -0.24 0.812 .9912621 1.006898

sp77\_605\_pp | .9889423 .0144918 -0.76 0.448 .9609428 1.017758

sp77\_606\_1\_pp | .9854471 .0042239 -3.42 0.001 .977203 .9937607

sp77\_606\_pp | 1 (omitted)

sp77\_700\_1\_pp | 1.010588 .0027495 3.87 0.000 1.005214 1.015992

sp77\_700\_pp | .9984681 .0027355 -0.56 0.576 .9931209 1.003844

sp77\_701\_1\_pp | .992666 .004524 -1.62 0.106 .9838387 1.001573

sp77\_701\_2\_pp | .9996885 .0027502 -0.11 0.910 .9943127 1.005093

sp77\_701\_3\_pp | .6948789 .0077257 -32.74 0.000 .6799005 .7101872

sp77\_701\_4\_pp | .9950073 .0042652 -1.17 0.243 .9866826 1.003402

sp77\_701\_pp | 1.000676 .0007574 0.89 0.372 .9991927 1.002162

sp77\_703\_pp | 1.002207 .0041418 0.53 0.594 .9941222 1.010358

sp77\_704\_1\_pp | 1.004521 .0012128 3.74 0.000 1.002147 1.006901

sp77\_704\_8\_pp | .997675 .0056342 -0.41 0.680 .986693 1.008779

sp77\_704\_9\_pp | .6935572 .0088183 -28.78 0.000 .6764873 .7110578

sp77\_704\_pp | .812114 .0067272 -25.12 0.000 .7990355 .8254066

sp77\_705\_pp | 1.000345 .0014274 0.24 0.809 .9975513 1.003147

sp77\_800\_1\_pp | .9969193 .0048074 -0.64 0.522 .9875412 1.006386

sp77\_800\_2\_pp | .9985168 .0033576 -0.44 0.659 .9919577 1.005119

sp77\_800\_pp | 1.00673 .0069367 0.97 0.330 .9932254 1.020417

sp77\_801\_pp | 1.011837 .0096814 1.23 0.219 .9930384 1.030991

sp77\_802\_pp | .9772355 .0067133 -3.35 0.001 .9641658 .9904823

sp77\_803\_pp | 1.000229 .005271 0.04 0.965 .9899507 1.010613

sp77\_804\_pp | 1 (omitted)

sp77\_805\_pp | 1.001696 .0026195 0.65 0.517 .9965749 1.006843

sp77\_807\_1\_pp | .9958633 .0058806 -0.70 0.483 .984404 1.007456

sp77\_807\_2\_pp | .9979558 .004759 -0.43 0.668 .9886717 1.007327

sp77\_807\_3\_pp | 1.004283 .0009529 4.50 0.000 1.002417 1.006152

sp77\_807\_pp | 1.001505 .0038564 0.39 0.696 .9939751 1.009092

sp77\_808\_pp | .9970651 .0104816 -0.28 0.780 .9767317 1.017822

sp77\_809\_pp | .9970836 .0013727 -2.12 0.034 .9943967 .9997777

sp77\_810\_pp | 1.006951 .0020677 3.37 0.001 1.002906 1.011011

sp77\_900\_1\_pp | 1.008004 .0072758 1.10 0.269 .9938445 1.022366

sp77\_900\_2\_pp | .9984177 .002604 -0.61 0.544 .9933269 1.003534

sp77\_900\_pp | .9968552 .0040313 -0.78 0.436 .9889852 1.004788

sp77\_901\_1\_pp | .7417944 .0146288 -15.15 0.000 .7136695 .7710277

sp77\_901\_pp | 1.001331 .0038004 0.35 0.726 .9939101 1.008808

sp77\_902\_2\_pp | .8046256 .009407 -18.59 0.000 .7863979 .8232759

sp77\_902\_3\_pp | 1.006872 .0047049 1.47 0.143 .9976926 1.016136

sp77\_902\_pp | .9996246 .0029962 -0.13 0.900 .9937694 1.005514

sp77\_903\_pp | .9938047 .0072671 -0.85 0.395 .9796631 1.008151

sp77\_904\_pp | .9991302 .0008653 -1.00 0.315 .9974358 1.000828

mine\_time | .9978118 .0017955 -1.22 0.223 .9942988 1.001337

onsite\_insp\_hours | .9996901 .0001363 -2.27 0.023 .999423 .9999573

|

state |

AL | 1.302834 .1762753 1.96 0.051 .9993558 1.69847

AR | 2.387764 .1630116 12.75 0.000 2.08872 2.729622

CO | .7224724 .1005876 -2.33 0.020 .5499347 .9491426

IL | 1.086319 .1040354 0.86 0.387 .900407 1.310617

IN | .8881131 .1832457 -0.58 0.565 .592705 1.330755

KY | .9784386 .0599078 -0.36 0.722 .8677932 1.103192

MD | 1.246551 .1573877 1.75 0.081 .973282 1.596546

MT | .7080408 .0650722 -3.76 0.000 .5913288 .8477886

NM | .8463467 .0630255 -2.24 0.025 .7314106 .9793441

OH | 1.01226 .1524464 0.08 0.936 .7535307 1.359825

OK | .743736 .3406739 -0.65 0.518 .3030536 1.825232

PA | .8688294 .0971078 -1.26 0.208 .697906 1.081614

TN | 1.195204 .215823 0.99 0.323 .8389516 1.702735

UT | .6097459 .1192313 -2.53 0.011 .415626 .8945301

VA | .6726495 .0560529 -4.76 0.000 .5712904 .7919918

WY | .9961162 .0872183 -0.04 0.965 .8390351 1.182605

|

time |

2007 | 1.272572 .1469297 2.09 0.037 1.014854 1.595736

2007.25 | 1.110638 .1381151 0.84 0.399 .8704028 1.41718

2007.5 | 1.206177 .1410391 1.60 0.109 .9591347 1.51685

2007.75 | 1.207316 .135836 1.67 0.094 .9683925 1.505186

2008 | 1.050787 .1156097 0.45 0.653 .8469621 1.303664

2008.25 | 1.061769 .1278088 0.50 0.619 .838625 1.344287

2008.5 | 1.203179 .1279439 1.74 0.082 .9768209 1.481991

2009 | .9901561 .1072079 -0.09 0.927 .800831 1.22424

2009.25 | .9095778 .1061951 -0.81 0.417 .7235363 1.143456

2009.5 | 1.127651 .1307301 1.04 0.300 .89845 1.415324

2009.75 | .8421056 .1012148 -1.43 0.153 .6653627 1.065797

2010 | .9207588 .1089442 -0.70 0.485 .7301831 1.161074

2010.25 | .9618618 .118646 -0.32 0.753 .755295 1.224923

2010.5 | 1.101829 .1346872 0.79 0.428 .8670887 1.400118

2010.75 | .8770042 .1030655 -1.12 0.264 .696576 1.104167

2011 | .9931128 .1160894 -0.06 0.953 .7897648 1.248819

2011.25 | .9667927 .1111346 -0.29 0.769 .771767 1.211102

2011.5 | 1.116214 .1267001 0.97 0.333 .8935697 1.394332

2011.75 | .9206081 .1061111 -0.72 0.473 .7344524 1.153947

2012 | 1.134006 .1239182 1.15 0.250 .9153778 1.404851

2012.25 | .9431888 .1095719 -0.50 0.615 .7511264 1.184361

2012.5 | 1.068413 .1250138 0.57 0.572 .8494564 1.343808

2012.75 | .893235 .1100112 -0.92 0.359 .7016675 1.137104

2013 | .9405509 .1067779 -0.54 0.589 .7529185 1.174943

2013.25 | .7789079 .1014616 -1.92 0.055 .603403 1.00546

2013.5 | 1.064822 .1243589 0.54 0.591 .8469669 1.338713

2013.75 | .8825229 .1036314 -1.06 0.287 .7010879 1.110911

2014 | .8127801 .1030017 -1.64 0.102 .634019 1.041943

2014.25 | .8628705 .1085062 -1.17 0.241 .6743832 1.104039

2014.5 | .9029707 .1105909 -0.83 0.405 .7102695 1.147953

2014.75 | .8996289 .1082529 -0.88 0.379 .7106207 1.138909

2015 | .9016371 .1069361 -0.87 0.383 .7146236 1.137591

2015.25 | .9227485 .1170122 -0.63 0.526 .7196875 1.183104

2015.5 | 1.178327 .1425385 1.36 0.175 .9296053 1.493595

2015.75 | .7254905 .1009859 -2.31 0.021 .5522648 .953051

2016 | .9649455 .1255197 -0.27 0.784 .7477886 1.245165

|

\_cons | 9.74e-06 9.81e-07 -114.59 0.000 8.00e-06 .0000119

ln(hours) | 1 (exposure)

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

/lnalpha | -2.258863 .333182 -2.911888 -1.605839

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

alpha | .1044692 .0348072 .054373 .2007212

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(est1 stored)

**. lrtest pois nbin, stats force**

Likelihood-ratio test LR chi2(26) = -19154.27

(Assumption: nbin nested in pois) Prob > chi2 = 1.0000

Akaike's information criterion and Bayesian information criterion

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

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

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

nbin | 14,895 -10132.51 -9783.922 349 20265.84 22921.31

pois | 28,337 -20154.17 -19361.06 375 39472.11 42566.58

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

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

**. summ MR spcpp1\_yhat**

Variable | Obs Mean Std. Dev. Min Max

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

MR | 30,289 .4096207 .9550592 0 14

spcpp1\_yhat | 28,337 .4388553 .6952244 0 13.22893