. // Model SP.B.V.4

**. eststo: logit MR\_indicator `subpart\_count\_lag\_all\_vars' `covariates' ib(freq).state ib(freq).time, vce(cl mineid) offset(lnhours) iter(50) or**

note: sp77\_902\_2\_c\_lag\_all != 0 predicts failure perfectly

sp77\_902\_2\_c\_lag\_all dropped and 1 obs not used

note: sp48\_4\_c\_lag\_all != 0 predicts failure perfectly

sp48\_4\_c\_lag\_all dropped and 4 obs not used

note: sp71\_701\_c\_lag\_all omitted because of collinearity

note: sp77\_801\_1\_c\_lag\_all omitted because of collinearity

note: sp77\_801\_c\_lag\_all omitted because of collinearity

note: sp75\_705\_3\_c\_lag\_all omitted because of collinearity

note: sp48\_24\_c\_lag\_all omitted because of collinearity

note: sp75\_834\_c\_lag\_all omitted because of collinearity

note: sp77\_606\_c\_lag\_all omitted because of collinearity

note: sp75\_1438\_c\_lag\_all omitted because of collinearity

Iteration 0: log pseudolikelihood = -6718.0656

Iteration 1: log pseudolikelihood = -6147.7296

Iteration 2: log pseudolikelihood = -6125.3612

Iteration 3: log pseudolikelihood = -6122.9547

Iteration 4: log pseudolikelihood = -6119.9908

Iteration 5: log pseudolikelihood = -6114.2641

Iteration 6: log pseudolikelihood = -6112.7211

Iteration 7: log pseudolikelihood = -6112.1807

Iteration 8: log pseudolikelihood = -6112.1798

Iteration 9: log pseudolikelihood = -6112.1798

Logistic regression Number of obs = 13,792

Wald chi2(371) = .

Log pseudolikelihood = -6112.1798 Prob > chi2 = .

(Std. Err. adjusted for 801 clusters in mineid)

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| Robust

MR\_indicator | Odds Ratio Std. Err. z P>|z| [95% Conf. Interval]

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

sp47\_41\_c\_lag\_all | 1.091299 .0677724 1.41 0.159 .9662337 1.232553

sp48\_11\_c\_lag\_all | 1.105899 .0770982 1.44 0.149 .9646585 1.267819

sp71\_701\_c\_lag\_all | 1 (omitted)

sp75\_1001\_1\_c\_lag\_all | .7664933 .3291116 -0.62 0.536 .3303888 1.778244

sp75\_1001\_c\_lag\_all | .362633 .1219775 -3.02 0.003 .187565 .7011046

sp75\_1003\_1\_c\_lag\_all | 1.277161 .5647562 0.55 0.580 .5368433 3.038394

sp75\_1400\_1\_c\_lag\_all | .7752595 .3417496 -0.58 0.564 .3267539 1.839388

sp75\_1401\_1\_c\_lag\_all | .8824757 .7404241 -0.15 0.882 .1704192 4.569692

sp75\_1401\_c\_lag\_all | .7680189 .3045222 -0.67 0.506 .3530754 1.670615

sp75\_1403\_11\_c\_lag\_all | .8856139 .8042397 -0.13 0.894 .1493671 5.2509

sp75\_1404\_1\_c\_lag\_all | .4315355 .1890194 -1.92 0.055 .1828845 1.018254

sp75\_1405\_1\_c\_lag\_all | 1.836892 1.993712 0.56 0.575 .2188835 15.41538

sp75\_1431\_c\_lag\_all | .4247119 .3177393 -1.14 0.252 .0980135 1.840361

sp75\_151\_c\_lag\_all | 1.722576 .9080235 1.03 0.302 .6130328 4.840311

sp75\_1721\_c\_lag\_all | .424834 .1553941 -2.34 0.019 .2074293 .8700986

sp75\_1731\_c\_lag\_all | 1.000593 .0028662 0.21 0.836 .9949906 1.006226

sp75\_1911\_c\_lag\_all | .9859293 .0156439 -0.89 0.372 .9557397 1.017072

sp75\_211\_c\_lag\_all | 1.01578 .0207262 0.77 0.443 .975959 1.057226

sp75\_341\_c\_lag\_all | 2.022629 .6640136 2.15 0.032 1.062853 3.8491

sp75\_506\_1\_c\_lag\_all | 1.09467 .1304651 0.76 0.448 .8666327 1.38271

sp75\_510\_1\_c\_lag\_all | .0956163 .1317219 -1.70 0.088 .0064255 1.422838

sp75\_511\_1\_c\_lag\_all | 1.384186 .4953202 0.91 0.364 .6864333 2.791195

sp75\_511\_c\_lag\_all | 1.073885 .0702437 1.09 0.276 .9446696 1.220775

sp75\_512\_1\_c\_lag\_all | 1.122496 .4673317 0.28 0.781 .4963661 2.538445

sp75\_513\_1\_c\_lag\_all | 1.044179 .1128432 0.40 0.689 .8448635 1.290516

sp75\_516\_1\_c\_lag\_all | 1.028296 .1778253 0.16 0.872 .7326869 1.443173

sp75\_517\_1\_c\_lag\_all | .808255 .1735719 -0.99 0.322 .5305836 1.231241

sp75\_518\_1\_c\_lag\_all | .9926626 .0289108 -0.25 0.800 .9375854 1.050975

sp75\_523\_1\_c\_lag\_all | 1.025159 .0315088 0.81 0.419 .9652259 1.088813

sp75\_600\_1\_c\_lag\_all | .833686 .2057144 -0.74 0.461 .5140035 1.352194

sp75\_601\_1\_c\_lag\_all | .9955026 .013522 -0.33 0.740 .9693496 1.022361

sp75\_601\_c\_lag\_all | 1.003063 .0215866 0.14 0.887 .9616344 1.046277

sp75\_700\_1\_c\_lag\_all | 1.407668 .2442087 1.97 0.049 1.001913 1.977747

sp75\_701\_1\_c\_lag\_all | 1.075098 .0709079 1.10 0.272 .9447284 1.223457

sp75\_701\_c\_lag\_all | 1.022199 .0139144 1.61 0.107 .9952879 1.049838

sp75\_702\_1\_c\_lag\_all | .221044 .1519951 -2.20 0.028 .0574345 .8507167

sp75\_703\_1\_c\_lag\_all | .4404669 .2342925 -1.54 0.123 .15529 1.249347

sp75\_705\_1\_c\_lag\_all | 1.173112 .30263 0.62 0.536 .707544 1.945027

sp75\_801\_c\_lag\_all | 1.397384 .4529113 1.03 0.302 .7403371 2.637557

sp75\_821\_c\_lag\_all | .975212 .1390674 -0.18 0.860 .7374214 1.289681

sp75\_831\_c\_lag\_all | 1.58127 .4584788 1.58 0.114 .8957891 2.791299

sp75\_901\_c\_lag\_all | 1.04483 .1023136 0.45 0.654 .8623685 1.265897

sp75\_902\_1\_c\_lag\_all | 1.14912 .2951128 0.54 0.588 .6946446 1.900937

sp77\_1111\_c\_lag\_all | 1.100357 .4528957 0.23 0.816 .4911199 2.465355

sp77\_401\_c\_lag\_all | 1.040203 .0871587 0.47 0.638 .8826651 1.225859

sp77\_403\_1\_c\_lag\_all | 1.140997 .1320923 1.14 0.255 .9093725 1.431619

sp77\_411\_c\_lag\_all | .3999947 .425142 -0.86 0.389 .0498125 3.21196

sp77\_501\_c\_lag\_all | 1.277201 .1796283 1.74 0.082 .9694923 1.682573

sp77\_502\_1\_c\_lag\_all | 1.037755 .4284858 0.09 0.928 .4619944 2.331059

sp77\_503\_1\_c\_lag\_all | .9120713 .262716 -0.32 0.749 .518616 1.604027

sp77\_506\_1\_c\_lag\_all | .9632742 .0442995 -0.81 0.416 .8802468 1.054133

sp77\_508\_1\_c\_lag\_all | 1.157501 .2153514 0.79 0.432 .8038162 1.666811

sp77\_511\_c\_lag\_all | .722804 .1307653 -1.79 0.073 .5070215 1.030421

sp77\_601\_c\_lag\_all | .73545 .2794647 -0.81 0.419 .3492239 1.548825

sp77\_606\_1\_c\_lag\_all | .6704701 .4969665 -0.54 0.590 .1568379 2.866209

sp77\_700\_1\_c\_lag\_all | .6775546 .2589149 -1.02 0.308 .320386 1.432897

sp77\_701\_1\_c\_lag\_all | .9922393 .1476155 -0.05 0.958 .7412814 1.328158

sp77\_701\_c\_lag\_all | 1.039319 .0372068 1.08 0.281 .9688945 1.114862

sp75\_811\_c\_lag\_all | .9758763 .0462755 -0.51 0.607 .8892651 1.070923

sp77\_704\_1\_c\_lag\_all | 1.79985 .6601714 1.60 0.109 .8770456 3.693607

sp77\_800\_1\_c\_lag\_all | 1.549323 .3026043 2.24 0.025 1.056552 2.271922

sp77\_801\_1\_c\_lag\_all | 1 (omitted)

sp77\_801\_c\_lag\_all | 1 (omitted)

sp77\_807\_1\_c\_lag\_all | .8782639 .3489139 -0.33 0.744 .403146 1.91332

sp77\_900\_1\_c\_lag\_all | 1.820271 .3725016 2.93 0.003 1.218837 2.718483

sp77\_901\_1\_c\_lag\_all | .1045477 .0624422 -3.78 0.000 .0324284 .3370572

sp77\_901\_c\_lag\_all | 1.218248 .3038781 0.79 0.429 .7471593 1.986361

sp47\_42\_c\_lag\_all | .7158657 .1132722 -2.11 0.035 .5249827 .9761534

sp75\_1100\_2\_c\_lag\_all | 1.022977 .0071591 3.25 0.001 1.009041 1.037105

sp75\_1102\_c\_lag\_all | .9425195 .0474843 -1.18 0.240 .8538993 1.040337

sp75\_1106\_2\_c\_lag\_all | .926034 .0494353 -1.44 0.150 .8340391 1.028176

sp75\_1400\_2\_c\_lag\_all | 1.294572 .303662 1.10 0.271 .8174542 2.050164

sp75\_1402\_2\_c\_lag\_all | .6798848 .5885548 -0.45 0.656 .1246169 3.709314

sp75\_1432\_c\_lag\_all | .3748038 .0942039 -3.90 0.000 .2290136 .613404

sp75\_1600\_2\_c\_lag\_all | .972888 .0286404 -0.93 0.350 .9183426 1.030673

sp75\_1912\_c\_lag\_all | 1.131476 .1243753 1.12 0.261 .9121757 1.403498

sp75\_202\_c\_lag\_all | .9992475 .0018547 -0.41 0.685 .9956189 1.002889

sp75\_212\_c\_lag\_all | .8934496 .0367336 -2.74 0.006 .8242775 .9684266

sp75\_312\_c\_lag\_all | 1.014784 .0272304 0.55 0.584 .9627925 1.069583

sp75\_342\_c\_lag\_all | .9880223 .0070784 -1.68 0.093 .9742459 1.001993

sp75\_352\_c\_lag\_all | .9033688 .0455909 -2.01 0.044 .8182894 .9972942

sp75\_382\_c\_lag\_all | 1.061095 .069724 0.90 0.367 .9328725 1.206942

sp75\_512\_2\_c\_lag\_all | .9733419 .0139619 -1.88 0.060 .9463583 1.001095

sp75\_512\_c\_lag\_all | .9993795 .0051927 -0.12 0.905 .9892537 1.009609

sp75\_516\_2\_c\_lag\_all | 1.011445 .0339462 0.34 0.735 .9470523 1.080215

sp75\_523\_2\_c\_lag\_all | .9807828 .0227433 -0.84 0.403 .9372045 1.026387

sp75\_601\_2\_c\_lag\_all | .7309004 .1811748 -1.26 0.206 .4496383 1.1881

sp75\_602\_c\_lag\_all | 1.045786 .040759 1.15 0.251 .9688751 1.128803

sp75\_701\_2\_c\_lag\_all | .831632 .0899218 -1.71 0.088 .6728114 1.027943

sp75\_702\_c\_lag\_all | 1.442604 .6337375 0.83 0.404 .6098362 3.412564

sp75\_703\_2\_c\_lag\_all | .9884215 .148657 -0.08 0.938 .7360764 1.327277

sp75\_705\_2\_c\_lag\_all | 4.983102 3.791034 2.11 0.035 1.121823 22.13477

sp75\_800\_2\_c\_lag\_all | 1.043806 .2866369 0.16 0.876 .6093598 1.787995

sp75\_802\_c\_lag\_all | .8604631 .1101632 -1.17 0.240 .6695065 1.105884

sp75\_803\_2\_c\_lag\_all | .2461548 .0496055 -6.96 0.000 .1658337 .3653792

sp75\_812\_c\_lag\_all | 1.098436 .3858259 0.27 0.789 .5518103 2.18655

sp75\_832\_c\_lag\_all | 2.909917 1.634407 1.90 0.057 .9678058 8.749296

sp75\_900\_2\_c\_lag\_all | .5771953 .1991695 -1.59 0.111 .2934968 1.135121

sp75\_902\_2\_c\_lag\_all | 1.093085 .0382481 2.54 0.011 1.020632 1.17068

sp75\_902\_c\_lag\_all | .9764539 .0226075 -1.03 0.303 .9331343 1.021785

sp77\_1112\_c\_lag\_all | .876367 .1589018 -0.73 0.467 .6142528 1.250331

sp77\_1432\_c\_lag\_all | .5080383 .2273945 -1.51 0.130 .2113024 1.221486

sp77\_1802\_c\_lag\_all | .9477096 .555617 -0.09 0.927 .3003574 2.990282

sp77\_202\_c\_lag\_all | .986532 .0206225 -0.65 0.517 .9469294 1.027791

sp77\_402\_c\_lag\_all | .9717974 .0348483 -0.80 0.425 .9058409 1.042556

sp77\_403\_2\_c\_lag\_all | .0309656 .0659594 -1.63 0.103 .0004762 2.013777

sp77\_412\_c\_lag\_all | 1.235887 .153663 1.70 0.088 .968602 1.576929

sp77\_502\_2\_c\_lag\_all | 1.024964 .0613464 0.41 0.680 .9115117 1.152537

sp77\_502\_c\_lag\_all | .9928867 .0100045 -0.71 0.479 .9734706 1.01269

sp77\_512\_c\_lag\_all | 1.00979 .0328202 0.30 0.764 .94747 1.07621

sp77\_602\_c\_lag\_all | 1.380671 .429193 1.04 0.299 .7507361 2.539179

sp77\_701\_2\_c\_lag\_all | .8641419 .1013739 -1.24 0.213 .6866401 1.087529

sp77\_702\_c\_lag\_all | 1.720259 .257717 3.62 0.000 1.282545 2.307357

sp77\_800\_2\_c\_lag\_all | .8039153 .1166407 -1.50 0.133 .6049351 1.068346

sp77\_802\_c\_lag\_all | 2.026755 1.476528 0.97 0.332 .486055 8.451176

sp77\_807\_2\_c\_lag\_all | .7900893 .1758879 -1.06 0.290 .5107209 1.222274

sp77\_900\_2\_c\_lag\_all | .9821925 .109511 -0.16 0.872 .7893882 1.222088

sp77\_902\_2\_c\_lag\_all | 1 (omitted)

sp77\_902\_c\_lag\_all | .7799266 .1556702 -1.25 0.213 .5274209 1.153321

sp47\_43\_c\_lag\_all | .2762412 .2344922 -1.52 0.130 .0523276 1.458297

sp72\_503\_c\_lag\_all | 1.036667 .0691427 0.54 0.589 .9096338 1.181441

sp75\_1106\_3\_c\_lag\_all | 1.005361 .0152023 0.35 0.724 .9760021 1.035603

sp75\_1400\_3\_c\_lag\_all | .9935121 .0910385 -0.07 0.943 .8301852 1.188971

sp75\_1403\_3\_c\_lag\_all | .3737105 .2448267 -1.50 0.133 .1034886 1.349515

sp75\_1433\_c\_lag\_all | .8539533 .1086964 -1.24 0.215 .6654079 1.095924

sp75\_153\_c\_lag\_all | .8559159 .4876968 -0.27 0.785 .2801692 2.614819

sp75\_1903\_c\_lag\_all | 1.028297 .0462366 0.62 0.535 .9415529 1.123032

sp75\_1913\_c\_lag\_all | 1.019155 .1206363 0.16 0.873 .8081357 1.285275

sp75\_503\_c\_lag\_all | 1.011088 .0026257 4.25 0.000 1.005955 1.016248

sp75\_513\_c\_lag\_all | .8939374 .0651803 -1.54 0.124 .774895 1.031268

sp75\_523\_c\_lag\_all | .995874 .0262637 -0.16 0.875 .9457058 1.048704

sp75\_601\_3\_c\_lag\_all | .8701922 .2293786 -0.53 0.598 .5190897 1.458774

sp75\_603\_c\_lag\_all | .9749991 .0579662 -0.43 0.670 .8677569 1.095495

sp75\_701\_3\_c\_lag\_all | 1.06302 .1123359 0.58 0.563 .8641516 1.307655

sp75\_703\_3\_c\_lag\_all | .9890092 .0722646 -0.15 0.880 .8570478 1.141289

sp75\_703\_c\_lag\_all | 1.07451 .036756 2.10 0.036 1.004832 1.149021

sp75\_705\_3\_c\_lag\_all | 1 (omitted)

sp75\_800\_3\_c\_lag\_all | .9817687 .1100442 -0.16 0.870 .7881338 1.222977

sp75\_803\_c\_lag\_all | .91471 .0855233 -0.95 0.340 .7615493 1.098674

sp75\_900\_3\_c\_lag\_all | .8869182 .0745339 -1.43 0.153 .7522309 1.045721

sp75\_903\_c\_lag\_all | 1.095678 .045868 2.18 0.029 1.009367 1.189368

sp77\_103\_c\_lag\_all | 1.059247 .259593 0.23 0.814 .6552253 1.712395

sp77\_1103\_c\_lag\_all | 1.013854 .0236458 0.59 0.555 .9685527 1.061275

sp77\_1403\_c\_lag\_all | 1.00266 .1553377 0.02 0.986 .7400839 1.358397

sp77\_1433\_c\_lag\_all | .7725118 .2441244 -0.82 0.414 .4158279 1.435148

sp77\_203\_c\_lag\_all | .8603367 .1075561 -1.20 0.229 .673371 1.099215

sp77\_403\_c\_lag\_all | .963956 .3240709 -0.11 0.913 .4987616 1.863036

sp77\_413\_c\_lag\_all | 1.300875 .5109393 0.67 0.503 .6024384 2.809044

sp77\_503\_c\_lag\_all | .9668572 .150824 -0.22 0.829 .7121638 1.312637

sp77\_513\_c\_lag\_all | 1.035283 .0405948 0.88 0.377 .9586993 1.117984

sp77\_603\_c\_lag\_all | 1.04172 .2902038 0.15 0.883 .6034235 1.798374

sp77\_703\_c\_lag\_all | .1448893 .1822502 -1.54 0.125 .0123125 1.705011

sp77\_803\_c\_lag\_all | 1.241663 .304577 0.88 0.378 .7677252 2.008174

sp77\_807\_3\_c\_lag\_all | 1.416723 .6993773 0.71 0.480 .5383718 3.728102

sp77\_903\_c\_lag\_all | 1.31484 .3279921 1.10 0.273 .8063754 2.14392

sp47\_44\_c\_lag\_all | 1.058108 .1005576 0.59 0.552 .8782857 1.274748

sp48\_24\_c\_lag\_all | 1 (omitted)

sp48\_4\_c\_lag\_all | 1 (omitted)

sp75\_1103\_4\_c\_lag\_all | .9860979 .0113678 -1.21 0.225 .9640673 1.008632

sp75\_1104\_c\_lag\_all | .8851686 .0437379 -2.47 0.014 .8034641 .9751816

sp75\_1106\_4\_c\_lag\_all | 1.080344 .1182763 0.71 0.480 .8717107 1.338911

sp75\_1107\_14\_c\_lag\_all | 20.21362 24.95082 2.44 0.015 1.798697 227.1592

sp75\_1400\_4\_c\_lag\_all | .7510656 .0865122 -2.49 0.013 .5992822 .9412919

sp75\_1403\_4\_c\_lag\_all | 2.813855 1.572338 1.85 0.064 .9411604 8.412783

sp75\_1404\_c\_lag\_all | 1.18139 .3587014 0.55 0.583 .651547 2.142105

sp75\_1434\_c\_lag\_all | 1.066828 .1230334 0.56 0.575 .8509977 1.337397

sp75\_1914\_c\_lag\_all | .9930739 .0074213 -0.93 0.352 .9786344 1.007726

sp75\_214\_c\_lag\_all | .9468178 .0352102 -1.47 0.142 .880262 1.018406

sp75\_324\_c\_lag\_all | 1.039311 .1154878 0.35 0.729 .8359113 1.292203

sp75\_344\_c\_lag\_all | 1.17678 .1516018 1.26 0.206 .9141913 1.514794

sp75\_504\_c\_lag\_all | .8873046 .0628374 -1.69 0.091 .7723107 1.019421

sp75\_514\_c\_lag\_all | 1.024752 .0172137 1.46 0.146 .9915632 1.059052

sp75\_604\_c\_lag\_all | 1.009708 .0052739 1.85 0.064 .9994242 1.020098

sp75\_701\_4\_c\_lag\_all | 1.178111 .2902371 0.67 0.506 .7269187 1.909354

sp75\_703\_4\_c\_lag\_all | 1.66745 .6304438 1.35 0.176 .7947365 3.498504

sp75\_704\_c\_lag\_all | .7452669 .1726454 -1.27 0.204 .4732886 1.173539

sp75\_800\_4\_c\_lag\_all | .9609562 .0803742 -0.48 0.634 .8156601 1.132134

sp75\_814\_c\_lag\_all | .8840537 .1864956 -0.58 0.559 .5846734 1.336731

sp75\_834\_c\_lag\_all | 1 (omitted)

sp75\_900\_4\_c\_lag\_all | 1.032035 .0341125 0.95 0.340 .9672955 1.101108

sp75\_902\_4\_c\_lag\_all | 1.159036 .0511179 3.35 0.001 1.063055 1.263683

sp75\_904\_c\_lag\_all | 1.012912 .0083024 1.57 0.118 .9967694 1.029315

sp77\_104\_c\_lag\_all | .3207223 .1454467 -2.51 0.012 .1318595 .7800939

sp77\_1104\_c\_lag\_all | .9937723 .0082814 -0.75 0.453 .9776729 1.010137

sp77\_1434\_c\_lag\_all | 1.706272 .4800236 1.90 0.058 .9830614 2.961528

sp77\_204\_c\_lag\_all | .9636952 .0442307 -0.81 0.420 .8807895 1.054404

sp77\_314\_c\_lag\_all | 1.819325 1.4692 0.74 0.459 .3736976 8.857274

sp77\_404\_c\_lag\_all | .9984399 .0085328 -0.18 0.855 .9818551 1.015305

sp77\_504\_c\_lag\_all | .980687 .0610619 -0.31 0.754 .8680222 1.107975

sp77\_514\_c\_lag\_all | .8111987 .178358 -0.95 0.341 .5271981 1.24819

sp77\_604\_c\_lag\_all | .8596793 .1807837 -0.72 0.472 .5692926 1.298187

sp75\_804\_c\_lag\_all | .8375167 .0439385 -3.38 0.001 .7556783 .9282179

sp77\_704\_c\_lag\_all | 1.403567 .4344539 1.10 0.273 .7651669 2.574603

sp77\_804\_c\_lag\_all | .7396937 .2661612 -0.84 0.402 .365399 1.497395

sp77\_904\_c\_lag\_all | .9517614 .0327616 -1.44 0.151 .8896681 1.018188

sp48\_25\_c\_lag\_all | 1.009365 .1127173 0.08 0.933 .8109485 1.256328

sp48\_5\_c\_lag\_all | .9996863 .0989991 -0.00 0.997 .8233209 1.213831

sp75\_1106\_5\_c\_lag\_all | .9339058 .0450375 -1.42 0.156 .8496772 1.026484

sp75\_1403\_5\_c\_lag\_all | .9836856 .0080535 -2.01 0.045 .9680269 .9995976

sp75\_1405\_c\_lag\_all | .9983338 .024184 -0.07 0.945 .9520416 1.046877

sp75\_1435\_c\_lag\_all | .6686593 .187326 -1.44 0.151 .3861352 1.157898

sp75\_155\_c\_lag\_all | .9100008 .6686036 -0.13 0.898 .2155955 3.840996

sp75\_1725\_c\_lag\_all | 1.004949 .0040842 1.21 0.224 .996976 1.012986

sp75\_1915\_c\_lag\_all | .899375 .1242265 -0.77 0.443 .6860698 1.178999

sp75\_505\_c\_lag\_all | 1.170558 .1783172 1.03 0.301 .8684104 1.577832

sp75\_515\_c\_lag\_all | .9707687 .011155 -2.58 0.010 .9491497 .9928801

sp75\_605\_c\_lag\_all | 1.001939 .019772 0.10 0.922 .9639267 1.041451

sp75\_705\_c\_lag\_all | 1.072864 .2894093 0.26 0.794 .632309 1.82037

sp75\_815\_c\_lag\_all | .9701053 .1467594 -0.20 0.841 .7211863 1.304939

sp75\_825\_c\_lag\_all | 1.183078 .2035254 0.98 0.328 .8444637 1.657471

sp75\_905\_c\_lag\_all | .7605492 .219615 -0.95 0.343 .4318527 1.339427

sp77\_1605\_c\_lag\_all | .996169 .0102474 -0.37 0.709 .9762855 1.016457

sp77\_1915\_c\_lag\_all | .7550145 .1638944 -1.29 0.195 .4933796 1.155392

sp77\_205\_c\_lag\_all | 1.00296 .0144795 0.20 0.838 .9749788 1.031745

sp77\_305\_c\_lag\_all | .0353673 .0356131 -3.32 0.001 .0049145 .2545191

sp77\_315\_c\_lag\_all | 2.789965 3.909308 0.73 0.464 .1790162 43.48157

sp77\_405\_c\_lag\_all | .8602574 .1014759 -1.28 0.202 .6826855 1.084017

sp77\_505\_c\_lag\_all | 1.014254 .026879 0.53 0.593 .962917 1.068328

sp77\_515\_c\_lag\_all | .4680856 .2869404 -1.24 0.216 .140777 1.556392

sp77\_605\_c\_lag\_all | .4934639 .3517437 -0.99 0.322 .1220434 1.995246

sp75\_805\_c\_lag\_all | 1.082897 .2449112 0.35 0.725 .6951473 1.686931

sp77\_705\_c\_lag\_all | 1.060667 .1126766 0.55 0.579 .8612998 1.306182

sp77\_805\_c\_lag\_all | 1.544454 1.481597 0.45 0.650 .2356222 10.12357

sp48\_26\_c\_lag\_all | 1.281908 .1579037 2.02 0.044 1.006948 1.63195

sp48\_6\_c\_lag\_all | .944452 .0628892 -0.86 0.391 .828896 1.076118

sp75\_1106\_6\_c\_lag\_all | .8749299 .4148055 -0.28 0.778 .3454757 2.215792

sp75\_1106\_c\_lag\_all | 1.08908 .1621476 0.57 0.567 .8134462 1.458112

sp75\_1403\_6\_c\_lag\_all | .9779784 .0091647 -2.38 0.017 .9601799 .9961069

sp75\_1436\_c\_lag\_all | 3.570675 5.534372 0.82 0.412 .1711708 74.48538

sp75\_156\_c\_lag\_all | .4930328 .2583015 -1.35 0.177 .1765747 1.376649

sp75\_1712\_6\_c\_lag\_all | 1.071416 .0555389 1.33 0.183 .967909 1.185992

sp75\_1726\_c\_lag\_all | 1.394608 .1407226 3.30 0.001 1.144358 1.699583

sp75\_506\_c\_lag\_all | .9234442 .0662014 -1.11 0.267 .8023953 1.062755

sp75\_516\_c\_lag\_all | .9773213 .015025 -1.49 0.136 .948312 1.007218

sp75\_606\_c\_lag\_all | 1.020744 .0073572 2.85 0.004 1.006426 1.035266

sp75\_706\_c\_lag\_all | 1.027032 .0821379 0.33 0.739 .8780277 1.201322

sp75\_816\_c\_lag\_all | .9885908 .030421 -0.37 0.709 .9307292 1.05005

sp77\_1106\_c\_lag\_all | 1.019738 .531239 0.04 0.970 .3673246 2.830919

sp77\_1606\_c\_lag\_all | 1.013328 .0159402 0.84 0.400 .9825621 1.045056

sp77\_1906\_c\_lag\_all | 1.061105 .2483436 0.25 0.800 .6707195 1.67871

sp77\_1916\_c\_lag\_all | 1.358682 .4803185 0.87 0.386 .679521 2.716645

sp77\_206\_c\_lag\_all | 1.106408 .1020726 1.10 0.273 .9233942 1.325695

sp77\_216\_c\_lag\_all | .9563746 .0510485 -0.84 0.403 .8613773 1.061849

sp77\_506\_c\_lag\_all | .9795802 .033595 -0.60 0.547 .9158994 1.047689

sp77\_516\_c\_lag\_all | 1.003045 .0150256 0.20 0.839 .9740233 1.032931

sp77\_606\_c\_lag\_all | 1 (omitted)

sp75\_806\_c\_lag\_all | 1.049168 .4311413 0.12 0.907 .4688728 2.347657

sp77\_906\_c\_lag\_all | .0764815 .1509902 -1.30 0.193 .0015963 3.664399

sp48\_27\_c\_lag\_all | .9884119 .0986044 -0.12 0.907 .8128712 1.201861

sp48\_7\_c\_lag\_all | 1.06314 .0739154 0.88 0.379 .9277052 1.218346

sp75\_1403\_7\_c\_lag\_all | 1.006375 .054122 0.12 0.906 .9056973 1.118245

sp75\_1437\_c\_lag\_all | 1.412077 .7300436 0.67 0.504 .5126101 3.88982

sp75\_1727\_c\_lag\_all | 1.062111 .2300501 0.28 0.781 .694708 1.623819

sp75\_337\_c\_lag\_all | 1.049825 .0463563 1.10 0.271 .9627892 1.144729

sp75\_507\_c\_lag\_all | 1.011195 .048238 0.23 0.815 .9209352 1.1103

sp75\_517\_c\_lag\_all | .9944677 .0035049 -1.57 0.115 .987622 1.001361

sp75\_607\_c\_lag\_all | .9567654 .0431177 -0.98 0.327 .8758809 1.045119

sp75\_827\_c\_lag\_all | .9280849 .2539437 -0.27 0.785 .5428513 1.586699

sp75\_907\_c\_lag\_all | .9857562 .0620349 -0.23 0.820 .8713694 1.115159

sp77\_1437\_c\_lag\_all | .3855449 .1905791 -1.93 0.054 .1463243 1.015859

sp77\_207\_c\_lag\_all | .9684785 .0418357 -0.74 0.458 .8898572 1.054046

sp77\_507\_c\_lag\_all | 1.111949 .1771408 0.67 0.505 .8137347 1.519452

sp75\_807\_c\_lag\_all | .9970649 .0085426 -0.34 0.732 .9804616 1.013949

sp77\_807\_c\_lag\_all | .8513086 .1229527 -1.11 0.265 .6414307 1.129859

sp48\_28\_c\_lag\_all | .8903428 .0629394 -1.64 0.100 .7751484 1.022656

sp48\_8\_c\_lag\_all | .7868411 .0910801 -2.07 0.038 .6271291 .9872273

sp75\_1403\_8\_c\_lag\_all | .9862703 .0105866 -1.29 0.198 .9657376 1.00724

sp75\_1438\_c\_lag\_all | 1 (omitted)

sp75\_1728\_c\_lag\_all | 1.870726 .2229032 5.26 0.000 1.481107 2.362836

sp75\_208\_c\_lag\_all | .986544 .0200453 -0.67 0.505 .9480279 1.026625

sp75\_518\_c\_lag\_all | .9882943 .0178538 -0.65 0.515 .9539136 1.023914

sp75\_705\_8\_c\_lag\_all | 1.394523 .6049996 0.77 0.443 .5958546 3.263704

sp75\_818\_c\_lag\_all | .800015 .3271864 -0.55 0.585 .3589035 1.783276

sp77\_1438\_c\_lag\_all | 1.249655 2.251818 0.12 0.902 .0365566 42.71833

sp77\_208\_c\_lag\_all | 1.020188 .0198621 1.03 0.305 .9819922 1.059869

sp77\_408\_c\_lag\_all | 1.139204 .2687223 0.55 0.581 .7174888 1.80879

sp77\_508\_c\_lag\_all | .9358831 .1342996 -0.46 0.644 .7064376 1.239851

sp75\_808\_c\_lag\_all | 1.288924 .1451168 2.25 0.024 1.033695 1.60717

sp77\_704\_8\_c\_lag\_all | 1.217767 .2917545 0.82 0.411 .7614338 1.947585

sp77\_808\_c\_lag\_all | .9503915 .3686671 -0.13 0.896 .4443368 2.032791

sp75\_1403\_9\_c\_lag\_all | .9714396 .071395 -0.39 0.693 .8411193 1.121951

sp75\_1729\_c\_lag\_all | .5570969 .1163812 -2.80 0.005 .3699211 .8389814

sp75\_1909\_c\_lag\_all | .9963193 .0063384 -0.58 0.562 .9839734 1.00882

sp75\_519\_c\_lag\_all | .9952111 .4874748 -0.01 0.992 .3810476 2.599269

sp75\_819\_c\_lag\_all | .1337093 .164204 -1.64 0.101 .0120456 1.484206

sp77\_309\_c\_lag\_all | .1872127 .1233905 -2.54 0.011 .0514416 .6813276

sp77\_409\_c\_lag\_all | 1.369777 .3617137 1.19 0.233 .8163475 2.298394

sp77\_509\_c\_lag\_all | .9346931 .0589317 -1.07 0.284 .8260406 1.057637

sp75\_809\_c\_lag\_all | 1.00767 .0451131 0.17 0.864 .9230179 1.100085

sp77\_704\_9\_c\_lag\_all | .4661224 .2005195 -1.77 0.076 .2005972 1.083117

sp77\_809\_c\_lag\_all | .969144 .0916016 -0.33 0.740 .8052568 1.166386

sp72\_610\_c\_lag\_all | 1.480031 .5858156 0.99 0.322 .6813244 3.215048

sp72\_620\_c\_lag\_all | .8052695 .3234195 -0.54 0.590 .3665001 1.769328

sp72\_630\_c\_lag\_all | .995695 .0101579 -0.42 0.672 .9759835 1.015805

sp75\_100\_c\_lag\_all | 1.186846 .2331431 0.87 0.383 .8075789 1.74423

sp75\_1101\_20\_c\_lag\_all | .9416441 .2830453 -0.20 0.841 .5224289 1.697252

sp75\_1400\_c\_lag\_all | 1.018358 .0640082 0.29 0.772 .9003237 1.151866

sp75\_1403\_10\_c\_lag\_all | 1.038263 .017431 2.24 0.025 1.004655 1.072995

sp75\_150\_c\_lag\_all | 1.910942 .4636101 2.67 0.008 1.187788 3.074368

sp75\_160\_c\_lag\_all | .8908016 .2785686 -0.37 0.712 .4826096 1.644243

sp75\_1712\_10\_c\_lag\_all | 1.031128 .108606 0.29 0.771 .8387985 1.267556

sp75\_1720\_c\_lag\_all | .9998371 .0462147 -0.00 0.997 .9132397 1.094646

sp75\_1730\_c\_lag\_all | 1.035279 .0748214 0.48 0.631 .8985443 1.192821

sp75\_1910\_c\_lag\_all | 1.013436 .0118453 1.14 0.253 .9904837 1.036921

sp75\_320\_c\_lag\_all | .9645605 .0240481 -1.45 0.148 .9185601 1.012864

sp75\_340\_c\_lag\_all | 1.027202 .0123455 2.23 0.026 1.003288 1.051686

sp75\_520\_c\_lag\_all | 1.029805 .0323707 0.93 0.350 .9682747 1.095246

sp75\_600\_c\_lag\_all | .5822902 .171485 -1.84 0.066 .3269338 1.037096

sp75\_700\_c\_lag\_all | .9819468 .0370251 -0.48 0.629 .9119955 1.057264

sp75\_800\_c\_lag\_all | .8564371 .0933544 -1.42 0.155 .6916905 1.060423

sp75\_820\_c\_lag\_all | 1.327734 .4404062 0.85 0.393 .6930578 2.543622

sp75\_900\_c\_lag\_all | .9931538 .025712 -0.27 0.791 .9440164 1.044849

sp77\_1710\_c\_lag\_all | .9417584 .0309589 -1.83 0.068 .8829936 1.004434

sp77\_200\_c\_lag\_all | 1.036312 .0142698 2.59 0.010 1.008718 1.064661

sp77\_210\_c\_lag\_all | 1.081125 .091935 0.92 0.359 .9151509 1.2772

sp77\_400\_c\_lag\_all | 1.016311 .0147055 1.12 0.264 .9878932 1.045546

sp77\_410\_c\_lag\_all | 1.004922 .0160393 0.31 0.758 .973972 1.036855

sp77\_500\_c\_lag\_all | .701876 .2062181 -1.20 0.228 .3946109 1.248394

sp77\_510\_c\_lag\_all | 1.356242 .589472 0.70 0.483 .578594 3.179071

sp77\_600\_c\_lag\_all | .8191696 .1549155 -1.05 0.292 .5654584 1.186717

sp77\_700\_c\_lag\_all | 1.171724 .1433699 1.30 0.195 .9218789 1.489281

sp75\_810\_c\_lag\_all | 1.016386 .0362815 0.46 0.649 .9477058 1.090043

sp77\_800\_c\_lag\_all | 1.08541 .2250606 0.40 0.693 .7229301 1.629638

sp77\_810\_c\_lag\_all | .8860448 .1596897 -0.67 0.502 .6223657 1.261437

sp77\_900\_c\_lag\_all | .8662525 .1532912 -0.81 0.417 .612374 1.225384

mine\_time | .9858811 .0059085 -2.37 0.018 .9743684 .9975298

onsite\_insp\_hours | 1.000837 .0002908 2.88 0.004 1.000267 1.001407

|

state |

AL | 1.385454 .4445964 1.02 0.310 .73865 2.598635

CO | .8086843 .2855019 -0.60 0.548 .4048243 1.615442

IL | 1.416981 .3736198 1.32 0.186 .8451329 2.375762

IN | .8448233 .3056234 -0.47 0.641 .4157527 1.716709

MD | 1.336792 .4537748 0.86 0.392 .6872629 2.600188

NM | 2.415343 2.14783 0.99 0.321 .42272 13.80082

OH | .4462949 .1604299 -2.24 0.025 .2206175 .9028257

OK | .858943 .8525904 -0.15 0.878 .1227604 6.009946

PA | 1.34811 .2768686 1.45 0.146 .9013836 2.016236

TN | 1.345138 .4378882 0.91 0.362 .7106759 2.54602

UT | 2.284538 .6823111 2.77 0.006 1.272256 4.102252

VA | .8183078 .1119562 -1.47 0.143 .6258355 1.069974

WV | 1.120547 .1220084 1.05 0.296 .9052092 1.387112

WY | 1.045071 .9122286 0.05 0.960 .1888616 5.782934

|

time |

2000.25 | .9067006 .1814143 -0.49 0.624 .6125674 1.342066

2000.5 | 1.326134 .2710249 1.38 0.167 .888435 1.979472

2000.75 | .668663 .1454777 -1.85 0.064 .4365316 1.024233

2001 | .8778568 .1813217 -0.63 0.528 .5856089 1.315951

2001.25 | .8800675 .1907732 -0.59 0.556 .5754401 1.345959

2001.5 | .9325686 .2087745 -0.31 0.755 .6013426 1.446237

2001.75 | .9178314 .2009951 -0.39 0.695 .597529 1.40983

2002 | .7890504 .1768909 -1.06 0.291 .5084879 1.224415

2002.25 | .5789787 .1381037 -2.29 0.022 .3627652 .9240586

2002.5 | .8472532 .1914225 -0.73 0.463 .5441249 1.319252

2002.75 | .8465031 .1940622 -0.73 0.467 .5401187 1.326685

2003 | .7633661 .18521 -1.11 0.266 .4744735 1.228157

2003.25 | .6756532 .1714389 -1.55 0.122 .4109052 1.110979

2003.5 | .8638862 .2102544 -0.60 0.548 .5361537 1.39195

2003.75 | .627524 .1558443 -1.88 0.061 .3856881 1.020997

2004 | .6545423 .1548436 -1.79 0.073 .4116905 1.04065

2004.25 | .7035641 .1566578 -1.58 0.114 .4547497 1.088516

2004.5 | .5777242 .1440741 -2.20 0.028 .3543611 .9418789

2004.75 | .5149882 .1266149 -2.70 0.007 .3180688 .8338224

2005 | .4933853 .1220443 -2.86 0.004 .303831 .8011987

2005.25 | .5612214 .1428151 -2.27 0.023 .3408218 .9241473

2005.5 | .6639312 .1580545 -1.72 0.085 .4163775 1.058666

2005.75 | .4117863 .1029942 -3.55 0.000 .2522162 .6723118

2006 | .7011682 .1726589 -1.44 0.149 .4327315 1.136125

2006.25 | .5162754 .1269408 -2.69 0.007 .3188524 .8359362

2006.5 | .6675417 .1599631 -1.69 0.092 .4173543 1.067707

2006.75 | .4828218 .1244431 -2.82 0.005 .291338 .8001597

2007 | .5803627 .1366943 -2.31 0.021 .3657749 .9208419

2007.25 | .4150497 .1083369 -3.37 0.001 .2488389 .6922804

2007.5 | .5924493 .1471867 -2.11 0.035 .3640665 .9640992

2007.75 | .5984547 .1467032 -2.09 0.036 .3701439 .9675915

2008 | .4266442 .1094045 -3.32 0.001 .2581024 .7052444

2008.25 | .4224284 .1080918 -3.37 0.001 .2558269 .6975256

2008.5 | .3974878 .1055796 -3.47 0.001 .2361729 .6689868

2008.75 | .4643702 .1226634 -2.90 0.004 .2767066 .7793081

2009 | .3307064 .089441 -4.09 0.000 .1946397 .5618933

2009.25 | .3243033 .0856175 -4.27 0.000 .1932994 .544092

2009.5 | .3571244 .0897656 -4.10 0.000 .2182048 .5844866

2009.75 | .2708148 .0731947 -4.83 0.000 .1594458 .4599723

2010 | .3599394 .0965145 -3.81 0.000 .2128077 .6087954

2010.25 | .429933 .1102712 -3.29 0.001 .2600643 .7107566

2010.5 | .4789234 .1291906 -2.73 0.006 .2822622 .812605

2010.75 | .3593879 .0945846 -3.89 0.000 .2145568 .6019837

2011 | .4294107 .1176127 -3.09 0.002 .2510351 .7345328

2011.25 | .4253567 .1137929 -3.20 0.001 .251789 .7185711

2011.5 | .5296553 .1364414 -2.47 0.014 .3196836 .8775387

2011.75 | .3196497 .0937934 -3.89 0.000 .1798498 .5681181

2012 | .3840326 .1025051 -3.59 0.000 .2275974 .647991

2012.25 | .3664043 .0997486 -3.69 0.000 .2148981 .6247246

2012.5 | .6375642 .1709512 -1.68 0.093 .3769552 1.078346

2012.75 | .3939603 .1122237 -3.27 0.001 .2254129 .6885351

2013 | .2944183 .0803059 -4.48 0.000 .1725003 .5025042

2013.25 | .2635921 .0782436 -4.49 0.000 .1473212 .4716279

2013.5 | .3609067 .0999772 -3.68 0.000 .2096997 .6211435

2013.75 | .4194062 .1252862 -2.91 0.004 .2335401 .7531962

2014 | .2675717 .0776562 -4.54 0.000 .1514955 .4725859

2014.25 | .3061149 .0944453 -3.84 0.000 .1672107 .5604085

2014.5 | .4135921 .1231451 -2.97 0.003 .2307443 .7413334

2014.75 | .5069476 .1524495 -2.26 0.024 .2811832 .91398

2015 | .4776866 .1485565 -2.38 0.018 .2596728 .8787385

2015.25 | .3754029 .1201741 -3.06 0.002 .2004522 .7030472

2015.5 | .5461719 .1704683 -1.94 0.053 .296249 1.006936

2015.75 | .3345478 .1165987 -3.14 0.002 .1689632 .6624059

2016 | .4817964 .1550044 -2.27 0.023 .2564563 .9051356

|

\_cons | .0000185 2.99e-06 -67.51 0.000 .0000135 .0000254

lnhours | 1 (offset)

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(est1 stored)

**. lfit**

Logistic model for MR\_indicator, goodness-of-fit test

number of observations = 13792

number of covariate patterns = 13792

Pearson chi2(13396) = 88490.30

Prob > chi2 = 0.0000

**. linktest**

Iteration 0: log likelihood = -8828.9823

Iteration 1: log likelihood = -6118.4382

Iteration 2: log likelihood = -6089.423

Iteration 3: log likelihood = -6089.3096

Iteration 4: log likelihood = -6089.3096

Logistic regression Number of obs = 13,792

LR chi2(2) = 5479.35

Prob > chi2 = 0.0000

Log likelihood = -6089.3096 Pseudo R2 = 0.3103

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

MR\_indicator | Coef. Std. Err. z P>|z| [95% Conf. Interval]

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

\_hat | 1.040071 .0213124 48.80 0.000 .998299 1.081842

\_hatsq | .0601283 .0086476 6.95 0.000 .0431792 .0770773

\_cons | -.0937592 .0273941 -3.42 0.001 -.1474507 -.0400676

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

**. estat classification**

Logistic model for MR\_indicator

-------- True --------

Classified | D ~D | Total

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

+ | 2817 876 | 3693

- | 1854 8245 | 10099

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

Total | 4671 9121 | 13792

Classified + if predicted Pr(D) >= .5

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Sensitivity Pr( +| D) 60.31%

Specificity Pr( -|~D) 90.40%

Positive predictive value Pr( D| +) 76.28%

Negative predictive value Pr(~D| -) 81.64%

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False + rate for true ~D Pr( +|~D) 9.60%

False - rate for true D Pr( -| D) 39.69%

False + rate for classified + Pr(~D| +) 23.72%

False - rate for classified - Pr( D| -) 18.36%

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Correctly classified 80.21%

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

**. summ MR\_indicator spbv4\_yhat**

Variable | Obs Mean Std. Dev. Min Max

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

MR\_indicator | 30,289 .24187 .428223 0 1

spbv4\_yhat | 13,792 .3386746 .2877231 .0000288 .9983427